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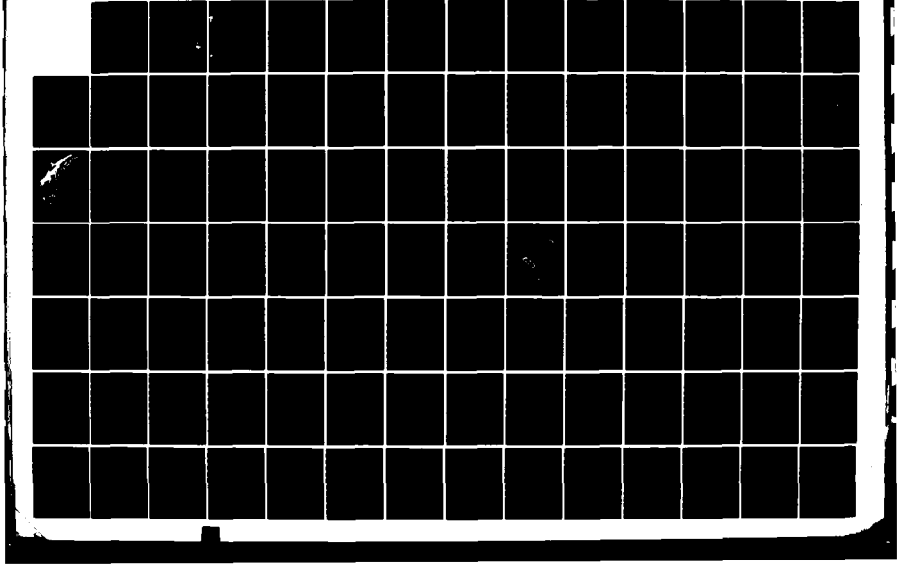

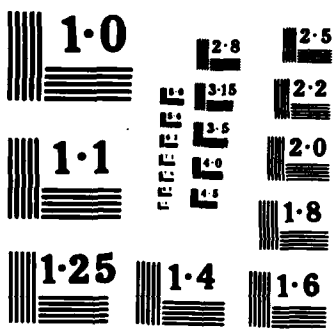
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GREAT LAKES ARCHAEOLOGICAL RESEARCH CENTER, INC.

Reports of Investigation No. 149

ARCHAEOLOGICAL INVESTIGATIONS AT THE GRANT RIVER PUBLIC USE AREA

VOLUME I: NARRATIVE

AD-A152 513

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 149	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Archaeological Investigations at the Grant River Public Use Area		5. TYPE OF REPORT & PERIOD COVERED Final 6/84 to 12/84 6. PERFORMING ORG. REPORT NUMBER N/A
7. AUTHOR(s) David F. Overstreet		8. CONTRACT OR GRANT NUMBER(s) DACW25-84-C-0041
9. PERFORMING ORGANIZATION NAME AND ADDRESS Great Lakes Archaeological Research Center 7509 Harwood Avenue Wauwatosa, Wisconsin 53213		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Rock Island Clock Tower Building - P.O. Box 2004 Rock Island, IL 61204-2004		12. REPORT DATE December 1984 13. NUMBER OF PAGES Vol. 1 -200; Vol. 2 - 262
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) See Item 11		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A

16. DISTRIBUTION STATEMENT (of this Report)

Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

N/A

18. SUPPLEMENTARY NOTES

Records, photographs, profiles, plan views, and artifacts are currently housed at Great Lakes Archaeological Research Center.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Cultural resource management, archaeology, geomorphology, excavation, mitigation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Investigations at the Grant River Public Use Area were implemented in order to mitigate potential adverse effects to a known archaeological site (47 Gt 24), the Osceola Site. The remnant of the Osceola Site was determined eligible for the National Register of Historic Places on March 9, 1984. Specific goals of the investigations included intensive survey of the area involving remote sensing techniques, soil coring, block and test excavation, reinterpretation of earlier investigations, and development of a long-term management plan for the area.

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ARCHAEOLOGICAL INVESTIGATIONS AT THE GRANT RIVER PUBLIC USE AREA

Submitted To: Rock Island District, Department of
The Army, Corps of Engineers
Clock Tower Building
Rock Island, IL 61201

Submitted By: David F. Overstreet

David F. Overstreet, Ph.D.
Principal Investigator
Great Lakes Archaeological Research Center, Inc.
7509 Harwood Avenue
Wauwatosa, WI 53213

In Compliance With: Contract No. DACW25-84-C-0041

December 1984

MANAGEMENT SUMMARY

This report entitled "Archaeological Investigations at The Grant River Public Use Area" was funded by the Rock Island District, U.S. Army, Corps of Engineers. The project was implemented in order to mitigate potential adverse effects to a known archaeological site (47 Gt 24), the Osceola Site, a purported "Old Copper" mortuary component (Ritzenthaler 1946), from planned recreational facilities. In part, these investigations fulfill obligations mandated by the National Environmental Policy Act of 1969 (P.L. 91-190), the National Historic Preservation Act of 1966 (P.L. 89-665) as amended, Protection and Enhancement of the Cultural Environment (E.O. 11593), the National Advisory Council's Procedures for the Protection of Historic and Cultural Properties (36 CFR Part 800), Recovery of Scientific, Prehistoric, Historic, and Archaeological Data: Methods, Standards, and Reporting Requirements (36 CFR Part 66), Preservation of Historic and Archaeological data 1974 (P.L. 93-291), the Archaeological Resources Protection Act of 1979 (P.L. 96-95), and Corps of Engineers Identification and Evaluation of Cultural Resources (E.R. 1105-2-50).

The remnant of the Osceola Site was determined eligible for The National Register of Historic Places on March 9, 1984, following test excavations by the Rock Island District, Corps of Engineers and a site inspection by a representative of the State Historic Preservation Officer of Wisconsin. Preservation of the site was considered not to be feasible for the following reasons: (1) 70 percent of the site had already been excavated; (2) riverbank erosion; (3) vandalism; (4) recreational use and the damaging effects of four-wheel drive and all terrain vehicles; and (5) proposed camp ground developments and conversion of the Grant River Recreation Area to fee status.

Archaeological investigations were initiated following submission of a proposal and research design. Specific goals included: (1) establishment of horizontal and vertical controls over the entire site; (2) ground penetrating radar and resistivity survey of the site to delineate sub-surface phenomena including but not restricted to archaeological deposits; (3) soil coring for stratigraphic and remote sensing interpretation; (4) block excavations; (5) test excavations at impact localities; (6) reinterpretation of earlier excavations at the Osceola Site (Ritzenthaler 1946); (7) reinterpretation of earlier excavations at the Hog Hollow Site (Geier 1978); and (8) development of a long-term management plan for the Grant River Recreation Area with an emphasis on preservation in context of remaining archaeological and historical data. All of these goals

have been realized. In addition, new insights relating to the effects of Middle to Late Holocene climatic changes on landscapes and population have been obtained.

The investigations entailed 255.5 man-days in the field and 91.4 m^3 were excavated. Refined matrix volumes harboring cultural materials are provided and the horizontal limits of the site considered appropriate for preservation are defined. Finally, tremendous local significance has been defined for the Osceola Site following an exhaustive search for and documentation of local collections.

Records, photographs, profiles, plan views, and artifacts are currently housed at Great Lakes Archaeological Research Center, Inc. The center can be contacted by mail at the following address: Great Lakes Archaeological Research Center, Inc., 7509 West Harwood Avenue, Wauwatosa, WI 53213, or, by phone at (414) 259-6020.

ACKNOWLEDGEMENTS

Great Lakes Archaeological Research Center, Inc. wishes to acknowledge the considerable assistance provided by many institutions and individuals throughout the course of these investigations. First, the residents of the Potosi region, many of whom provided much valuable information are commended for their interest and support. Mr. Charles Smith and Mr. J. Paul VanHoorbeke of the Rock Island District, U.S. Army Corps of Engineers provided both technical and administrative support during the course of our efforts. The Historic Preservation Division, State Historical Society of Wisconsin, in particular Mr. William Green, took strong interest in the recovery of information and preservation of archaeological deposits at the Grant River Public Use Area.

Mr. Paul Lurenz, Jr. functioned in the capacity of field supervisor, Mr. Jeff Anderson conducted geomorphic investigations on the terrace and his work serves as the basis of many of the conclusions drawn from this research. Mr. Norman Sullivan, Department of Anthropology, Marquette University, provided critical information regarding the burial population at the Osceola Site. Archaeological crew members included James Clark, Jr., Sheri Stang, Will Gilmore, Paul Koeppler, James Stark, Martha Tappen, and Richard Darling. Ms. Joan Underwood, Donohue & Associates Inc. directed the remote sensing investigations and provided the data interpretation.

Mr. Randy Haas, Mr. Otis Peterson, and several other staff members of the Rock Island District Corps of Engineers coordinated construction activities and provided support for the investigations. Mr. Neil Ostberg and Mr. Richard Audetat visited the site and provided both information and support for these investigations. Nikki Wackman formatted, keyed, and produced this final report and Barbara Overstreet developed the graphics from field records.

In addition, our thanks are expressed to the staff of the Department of Anthropology, Milwaukee Public Museum for providing access to records and collections from the 1945 excavations. Finally, a special note of gratitude is due the late Dr. Robert Ritzenthaler for his life-long commitment to the salvage of Wiscosnin's threatened archaeological sites. This commitment brought him to the Osceola Site in 1945, and his work provided the impetus for further investigations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

LIST OF APPENDICES
(VOLUME 2)

INTRODUCTION:

During the months of July, August, and September, 1984, Great Lakes Archaeological Research Center, Inc. conducted archaeological investigations at the Grant River Public Use Area near the town of Potosi, Grant County, Wisconsin. Work was conducted under the auspices of contract No. DACW 25-84-C-0041, Rock Island District, Corps of Engineers. The locality has long been known for its archaeological resources and the public use area harbors what remains of the Osceola Site (47 Gt 24) (Ritzenthaler 1946), the Hog Hollow Site (47 Gt 266), and an uncodified campsite reported by Brown (n.d.). Figure 1 depicts the study area environs and Figure 2 notes the locations of the Osceola and Hog Hollow Sites.

Recovery and monitoring operations were necessitated by development plans for the site and other factors which include erosion, vandalism, and damage from all terrain vehicles. Data recovery was also an attractive option because data from controlled excavations in this region are quite limited. Thus, there is a need to secure controlled data for research and management goals regardless of deterioration of specific sites or development plans. Following determination of eligibility of the Osceola Site for the National Register of Historic Places in March of 1984, a proposal and research design to implement recovery, monitoring, and planning efforts was submitted to the Rock Island District, U.S. Army Corps of Engineers in response to a request for proposals (see Appendices A and B).

Several specific goals are identified in the scope-of-work which was reviewed and approved by the Advisory Council on Historic Preservation and by the Wisconsin SHPO. Additional and/or revised goals are also incorporated in the technical proposal. First, given the distribution of artifacts derived from various survey and testing operations, the maximum horizontal extent of cultural deposits was calculated at 450,000 square feet. In addition, cultural materials had been recovered at depths of 4 feet below the present surface. Thus, the cultural matrix volume was calculated at 1,800,000 cubic feet. It was graphically clear that complete recovery of the cultural deposit was not feasible. As a result, our first objective was to establish vertical and horizontal controls over the entire site area with a transit and integrate a metric grid with the detailed site map provided by the Rock Island District. The detail map, which includes the precise localities of proposed developments was developed with a 1' contour interval.

The second objective was to refine existing survey and testing data to verify the horizontal and vertical distribution of site matrix that contained potentially significant

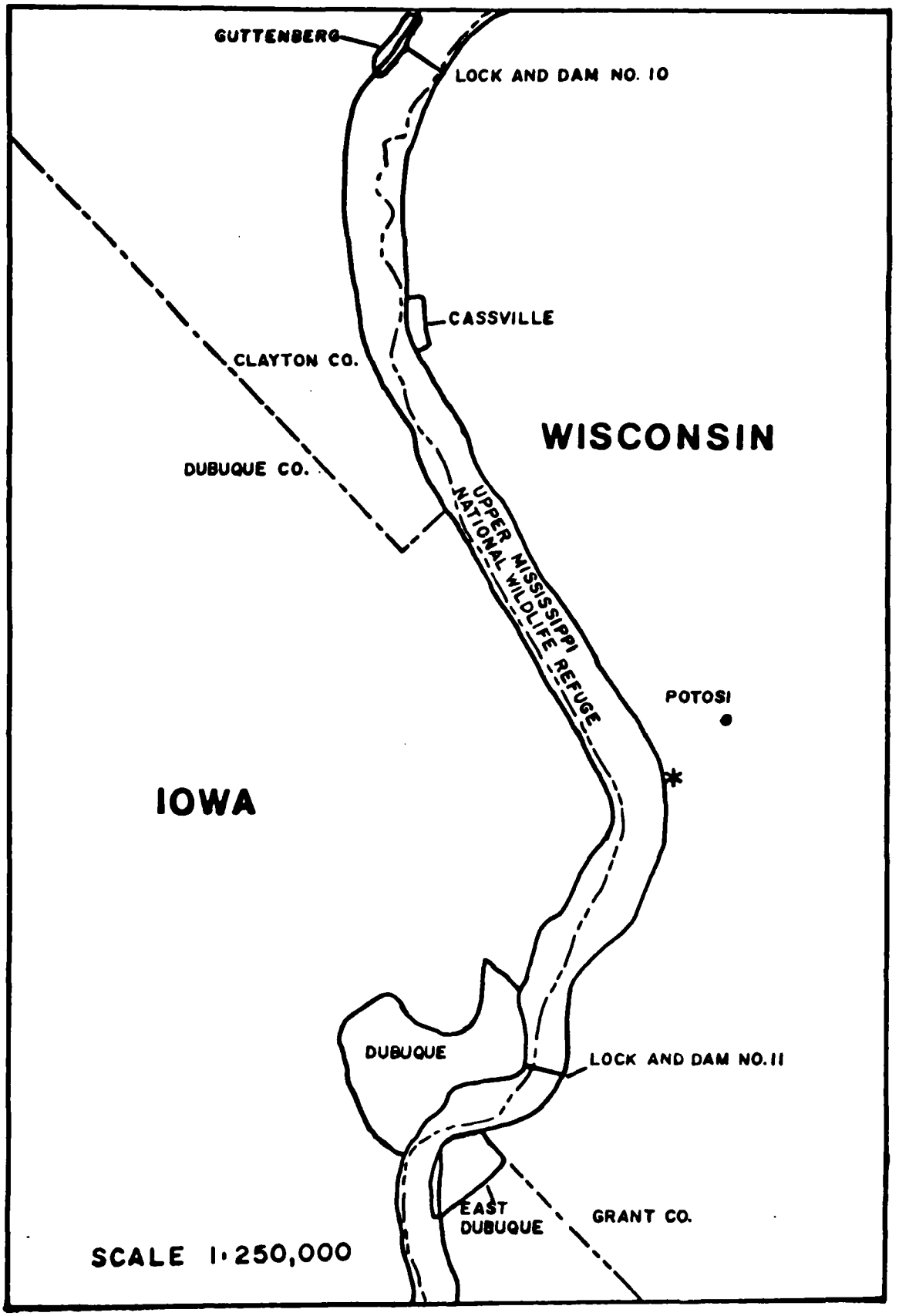

Figure 1: Study Area Environs (*denotes Grant River Public Use Area).

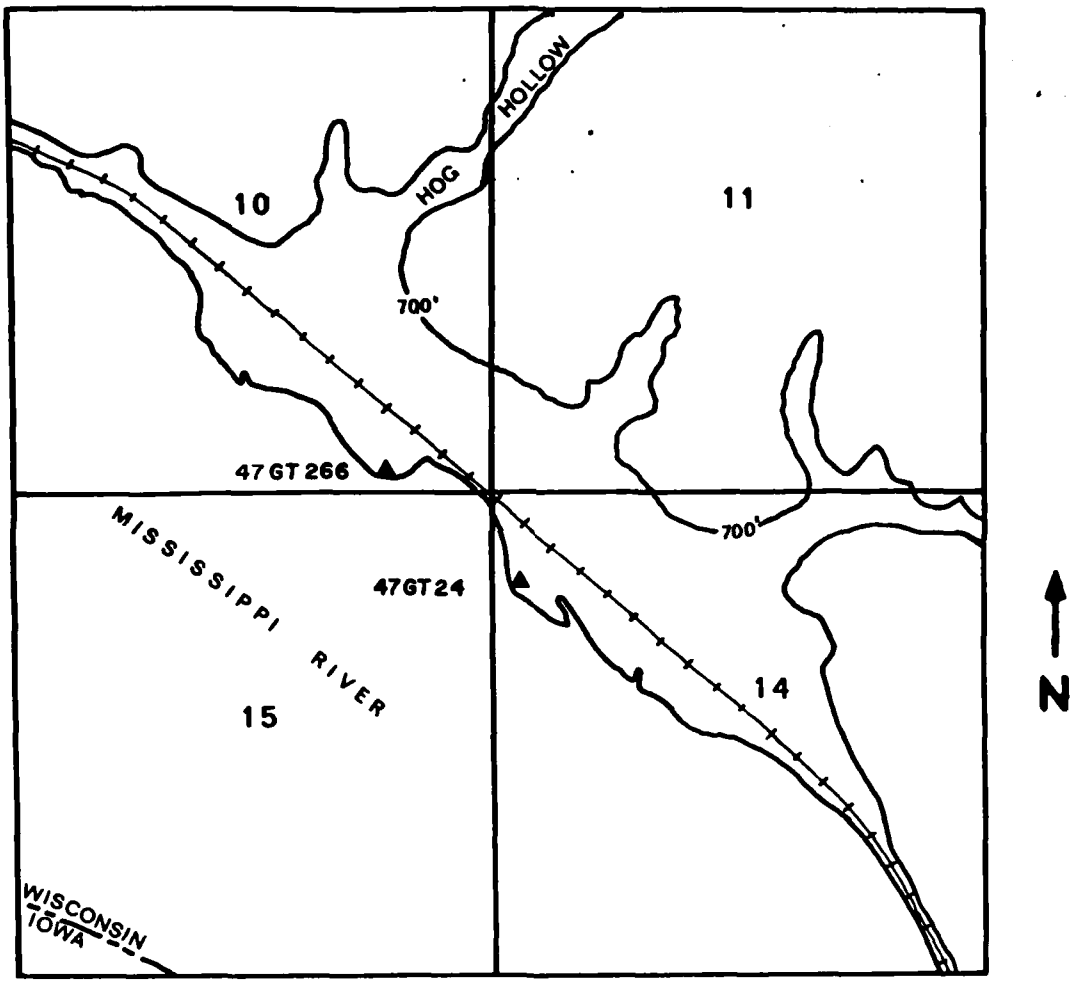

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Figure 2: Location of Osceola and Hog Hollow Sites. (Osceola 47 Gt 24, Hog Hollow (47 Gt 266)

archaeological deposits. As a first step in realizing this objective, ground based remote sensing investigations were employed. Two techniques were utilized: ground penetrating radar and resistivity. Ground penetrating radar data were collected along established grid transects to plot the distribution of sub-surface anomalies which were later checked by coring and excavation. Resistivity was applied to a dense artifact location determined by ground penetrating radar and confirmed by excavation.

A third objective entailed the development of a comprehensive geomorphic history of that portion of the Potosi terrace occupied by the Grant River Public Use Area. Data collection techniques included remote sensing investigations, soil coring, and historic map evaluation and reconstruction. Site formation processes revealed through these techniques were supplemented by stratigraphic data from excavations at the site. This objective was not restricted exclusively to the camp area, but included investigations at the nearby Hog Hollow Site (47 Gt 266), a prominent alluvial fan, north-northeast of the recreation area, and in the beds of local drainages. Historic maps were utilized to reconstruct the environment prior to construction of the locks and dams in order to place the remaining landform in context with the now submerged Grant River estuary.

The fourth objective entailed excavation both of block units, designed to recover information relevant to earlier studies (Ritzenthaler 1946, Geier 1978), to attempt to clarify the prehistoric components revealed in survey and testing of the recreation area, and excavation at sites of direct impact from proposed campground improvements. In so far as possible, it was our intent to segregate specific components for analytical procedures that would allow comparison of adaptive strategies relative to each identified component.

The fifth primary objective was to evaluate the results of this research in an attempt to clarify interpretations of Ritzenthaler's (1946) data from the Osceola Site (47 Gt 24) and Geier's (1978) data from the Hog Hollow Site (47 Gt 266). The Osceola Site has had some prominence both in the national and regional literature. It serves as the type site for the "Old Copper" burial complex as the first site of this complex to be excavated and reported. However, several features, based on additional information collected subsequent to Ritzenthaler's pioneering work, make the Osceola Site unique. First, the Osceola Site is spatially removed from the core area of "Old Copper" sites in northeastern Wisconsin, Michigan, and Ontario. Second, the mortuary contexts at Osceola are unique in many respects when compared to sites such as Reigh, Oconto, Riverside, and others.

The Hog Hollow Site (47 Gt 266) is also problematical. Geier (1978) reported the site as a single component and suggested that the various ceramic types in the assemblage represented a component reflecting a transition from Middle

to Late Woodland lifeways. Others, (see Stoltman 1983) have rejected Geier's interpretations and have assumed that several components are represented at Hog Hollow.

The last objective relating specifically to the Grant River Public Use Area was to develop a long term management plan for the site. Assuming that the site was significantly large and that time and resources would preclude complete recovery, it was proposed that a plan focusing on preservation in context be developed. Consistent with the approach defined by King (1982), consideration was to be given to plan development that would integrate the management of cultural resources, natural resources, and recreation needs without sacrificing one for another.

Finally, an objective defined during the course of the field investigations, and, a reflection of natural erosional processes evident at the site, relates to climatic changes that occurred during the Holocene. Numerous reconstructions of changes in Holocene climate have been presented. Many of these climatic models are in conflict, often dependent on the types and sources of data utilized by scholars. In some instances pollen profiles have served as the data base while in others, focus has been placed on alluvial stratigraphy or on world-wide interpretation of radiocarbon chronologies. Regardless of which of the various models one utilizes or favors, the effects of changes in climate on past cultural systems is unknown. Thus, our last objective is to review models of climatic change and interpret their potential effects from the perspective of human populations who occupied or used the resources of the Potosi terrace during the post-glacial period.

Prior to deployment of the field crew considerable attention was directed toward reconstructing the habitat of the Osceola Site residents. Artifact collections indicate at least sporadic use of the locality for perhaps the past 9,000 years. Utilizing the Mississippi River Commission maps compiled in the late 19th century one is confronted with a habitat characterized by abundant resources. A relatively complex estuary at the confluence of the Mississippi and Grant Rivers afforded local inhabitants options for a wide range of resources. Aquatic flora and fauna must have been available in the form of tubers and wild rice, fish, water fowl, large and small mammals, and fresh water mussels. The myriad of back-water lakes, ponds, side channels of the rivers, and the main stems of the Mississippi and Grant Rivers represented a complex mosaic of ecological niches.

Immediate access to the uplands either by water up the Grant River, or on foot up the intermittent drainages that cut through the bluffs in the characteristic hollows or coulees also provides residents with additional opportunities. Not only was access provided to upland food resources, but to two important economic commodities as well: Galena chert for the manufacture of stone tools and the mineral deposits of galena, the metallic, cleavable iso-

metric lead sulfide which occurs in shiny cubes of various sizes. Throughout much of the Holocene these plant, animal, and economic resources attracted people to the Potosi terraces and surrounding environs.

As a point of departure, the late 19th century maps with their detailed portrayal of aquatic features, topography, and plant communities, are a useful source. Needless to say, this environment has been subjected to profound changes, and, at one point in time was perhaps less hospitable than in others. Thus, as one key to understanding past human occupation it is necessary to detail events during the Pleistocene resulting in the development of local landforms, the effects of the Holocene, and, ultimately, the events of historic times which have shaped the landscape to its present configuration.

ENVIRONMENT AND ECOLOGY OF THE POTOSI TERRACE, GRANT AND MISSISSIPPI RIVER FLOODPLAINS:

Site Formation Processes - Pre-Wisconsinan Events

The basal alluvial deposits found at the Potosi terrace are likely sediments deposited during the post Kansan Age. The last major episode of deep upper Mississippi valley incision presumably occurred during Illinoian glaciation. Isostatic downbending under glacial load accompanied by upwarping in the peripheral belt of the glacier could have accounted for major Mississippi valley incision. Forebulge uplift in the Driftless area of southwestern Wisconsin and northwestern Illinois steepened the valley gradient necessary for rapid and deep incision of the upper Mississippi River valley (Willman and Frye, 1969, Knox and Johnson, 1974). As the Illinoian glacier retreated the weight of the ice was reduced in the recently glaciated landscapes. These landscapes tended to rebound while the forebulged Driftless area began to subside. The steep valley gradient of the Mississippi was greatly reduced resulting in valley aggradation.

Alluvial deposition probably continued throughout much of the post Illinoian, although the magnitude and duration of valley aggradation is for the most part unknown. Near Dubuque, Iowa, Whitlow and Brown (1963) estimate the depth of valley fill in the Mississippi to be approximately 400 feet. Upstream about 10 miles from Dubuque near Potosi, Whitlow and West (1966) estimate the depth of fill to be approximately 300 feet. A detailed geologic cross section taken across the Mississippi near Prairie du Chien, Wisconsin, included a total of 27 borings. None of the holes penetrated the valley fill into the underlying bedrock (Church, 1984). Consequently, the amount of valley fill found near the Potosi terrace is unknown and the amount considered to be pre-Wisconsinan is even more obscure. Therefore, it is likely that the basal gravelly sand unit beneath the terrace is pre-Wisconsinan in age although the

depth where this unit can be located has yet to be determined.

Wisconsinan and Holocene Potosi Terrace Development:

Episodes of valley aggradation and degradation occurred throughout the Wisconsinan Age. This is particularly evident during the late Wisconsinan or Woodfordian Substage when much of the sand and gravelly sand units were deposited in the Mississippi River valley. During the late Woodfordian rapid alluviation occurred in the Mississippi and Wisconsin River valleys (Knox and Johnson, 1974). The Mississippi continued to aggrade until the Red River and Superior Lobes retreated north around 12,200 years B.P. (Clayton, 1982). Upon retreat of the lobes, rapid entrenchment occurred in the valley. By 11,500 B.P. both the Red River and Superior Lobes re-advanced causing renewed aggradation. This event was followed by subsequent entrenchment until 10,800 B.P. The final episode of entrenchment occurred when glacial advances blocked eastward drainage to Lake Superior causing the discharge of meltwater through the Mississippi from 9900 to 9500 B.P.

The Mississippi River valley aggraded and degraded in response to the sediment load and discharge volume of the glacial meltwater. During periods of glacial advances bedload was introduced into the drainage network causing aggradation from high coarse sediment volumes. But when drainage was blocked or when glacial lakes (such as Lake Agassiz) formed, periodic high magnitude discharges would occur, perhaps catastrophically with relatively sediment free water initiating valley entrenchment.

Although catastrophic discharges associated with glacial lake drainage carried little bedload, Flock (1983) suggests that these discharges carried considerable quantities of fine grained sediment. According to Flock, the clay rich sediment found on Mississippi River terraces (the Savannah Terrace) and in tributary terraces result from high magnitude discharges associated with the drainage of glacial Lakes Agassiz and Superior between 13,000 and 9500 B.P. Meltwater containing red clay from glacial Lake Superior drained through the St. Croix River valley and into the Mississippi valley. Further west, Lake Agassiz containing grey clay discharged through the Minnesota River valley and into the Mississippi valley. This suggests that discharges were of significantly high magnitude to create slack-water conditions necessary for the deposition of fine grained sediments.

Throughout the late Wisconsinan net aggradation probably built up the Potosi terrace to an elevation 40 feet above the present terrace surface. Evidence of this is seen a few miles downstream near the mouth of the Platte River where a late Woodfordian terrace is observed to have a surface elevation of 650 feet above mean sea level (Knox, personal communication). The elevation of the Potosi

terrace is about 610 feet which suggests that the terrace was scoured approximately 40 feet during the final catastrophic discharges through the Mississippi valley. For a more comprehensive discussion regarding the chronology of Woodfordian events in the upper Mississippi valley refer to Clayton (1982), Clayton and Moran (1982), Teller and Clayton (1983), and Church (1984).

Holocene Climatic Impact on the Potosi Terrace:

During the early and into the middle Holocene atmospheric circulation was greatly affected by the wasting Laurentide ice mass to the north of the Driftless area. A zonal upper atmospheric circulation component dominated providing a cool and relatively dry northwesterly flow out of Canada (Knox, 1983). The persistence of a zonal circulation regime effectively blocked the intrusion of maritime tropical air masses derived from the Gulf of Mexico. As the Laurentide ice mass wasted further to the north, a more westerly upper atmospheric component penetrated the upper Mississippi valley. This circulation pattern provided for the intrusion of Pacific derived air masses, which continued to block the more humid maritime tropical air masses to the south. The result was the persistence of warmer more arid pacific air masses dominating the upper Mississippi valley during the middle Holocene. From 9500 to 4700 B.P. in east central Minnesota there was an increase in the duration of Pacific air producing a 2 inch decrease in precipitation during the maximum penetration of westerly air about 7200 B.P. (Webb and Bryson, 1972). There were likely long periods of drought in southwestern Wisconsin, perhaps a century in duration. This would indicate that landscapes particularly sensitive to the desiccating effects of drought may have lost their vegetative cover resulting in surface reworking and instability.

The prevailing climatic regime determines the nature of the vegetation cover, while the type and density of vegetation colonizing a landform controls both the geomorphic and pedogenic processes working to change the landform. Webb, Cushing, and Wright (1983), and Wright (1976), have traced Holocene climatic changes through the upper Mississippi valley from the migration and succession of several vegetation species. The early advance and later retreat of the "Prairie Peninsula" suggests changes in air mass dominance during the Holocene. In response to increased aridity, the prairie/forest ecotone advanced eastward across the Iowa-Wisconsin border about 8000 B.P.

The waning of Laurentide ice continued during the middle Holocene and by 6500 B.P. the ice had retreated to the Quebec/Labrador plateau (Wright, 1983). This condition began to deteriorate the persistent zonal circulation pattern that was established earlier in the Holocene. Consequently, a meridional upper atmospheric circulation

pattern was beginning to influence the climatic scenario in the upper Mississippi valley.

Meridional circulation patterns provide the mechanism necessary for the mixing of unlike tropical and polar air masses. The result of this pattern causes an increase in the frequency and magnitude of precipitation events (Knox 1975). By the beginning of the late Holocene about 4500 B.P., the upper Mississippi valley was experiencing a more dominant meridional circulation regime. The prairie/forest ecotone responded by migrating back to the west, crossing the Iowa-Wisconsin border around 4000 B.P. (Webb, Cushing, and Wright, 1983).

The late Holocene climate which includes contemporary twentieth century climate is characterized by persistent episodes of either meridional or zonal circulation. The orientation of the jet stream over the North American continent determines whether the upper Mississippi valley will receive a relatively cool/moist, cool/dry, warm/moist, or warm/dry climatic pattern (Knox, 1979). Persistence of any one of these climatic scenarios can change the magnitude and direction of geomorphic processes controlling landscape evolution.

Historic Modifications of the Terrace Environs:

As one looks toward the bluffs on the Iowa side of the Mississippi River from the Grant River Public Use Area across the broad expanse of water it is difficult to envision the pre-lock and dam environment. More than a mile of fast land and the aquatic features of the Grant River and associated ponds, sloughs and lakes have been inundated by the construction of the lock and dam at Dubuque. Figure 3 depicts the configuration of the land prior to development of the 9 foot navigation channel. Figure 4 portrays the environment near the close of the 19th century, a time when navigation improvements primarily in the form of wing dams, steamboat landings, canals, and other features had already begun to foster changes on the river.

As Figure 4 indicates, in 1893 considerable ecological diversity existed within a narrow zone. Back-water lakes, marsh, and ponds would have provided ample nesting grounds for waterfowl. Stands of oak, maple, birch, and elm would have occupied the better drained localities on the floodplain while willow, cottonwood (poplar), and perhaps ash, dependent on the species, would have colonized the less well drained localities. Oaks, Walnut, and Hickory, as well as grasses were historically documented and remain today on areas of the terrace. Finally, the uplands would have supported Red Cedar, some pines, and segments of dry prairie.

Of the diversity of arboreal species in the southern lowland forest Curtis notes:

> The lowland forests thus have more species of trees than any other community in Wisconsin. In

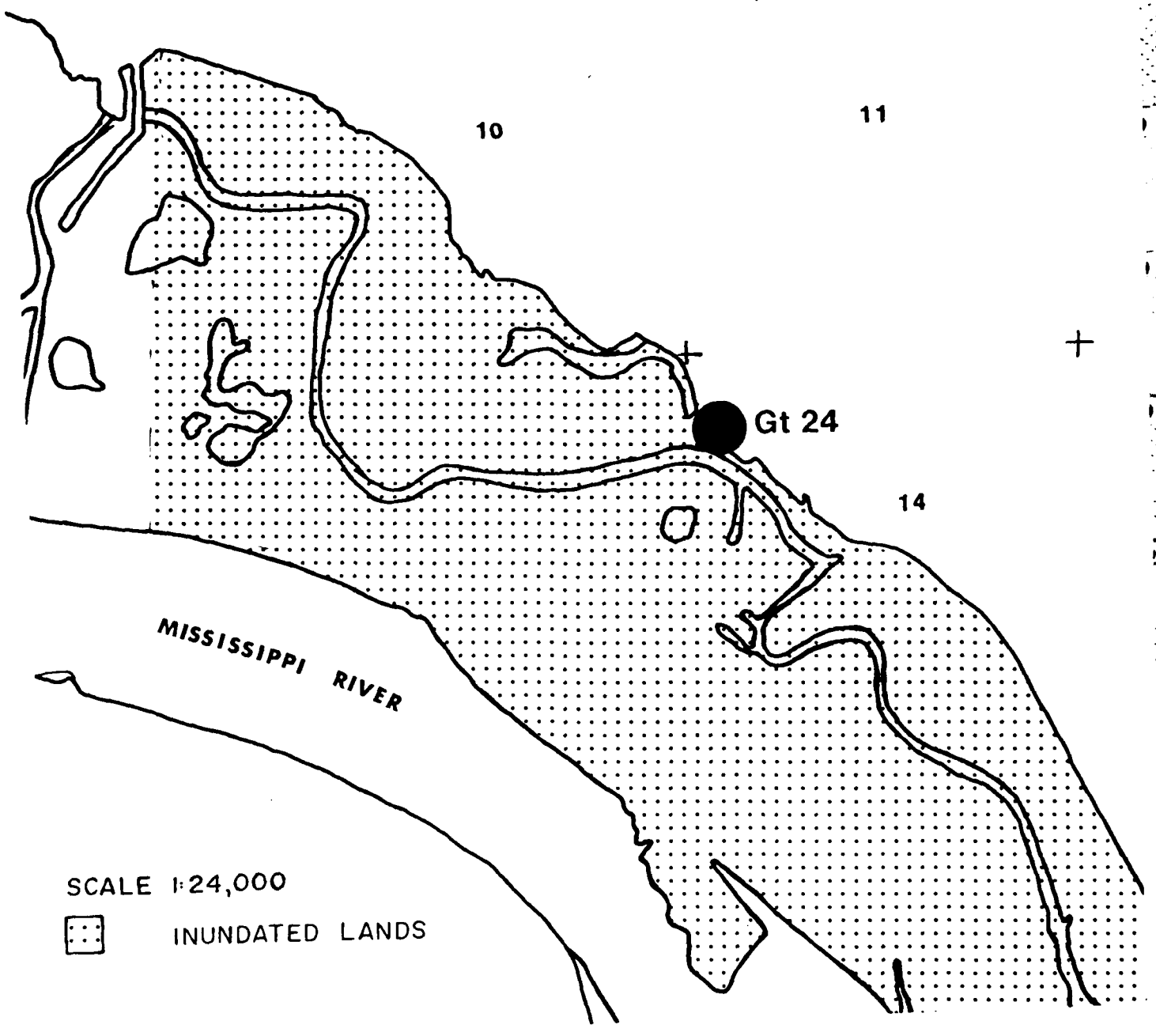

Figure 3: Landform Configuration prior to Lock & Dam Construction. (lands adjacent to sections 10, 11, and 14, Potosi Township, corrected by Kail projection to U.S.G.S. 7.5' Quadrangle, Scale 1:24,000.)

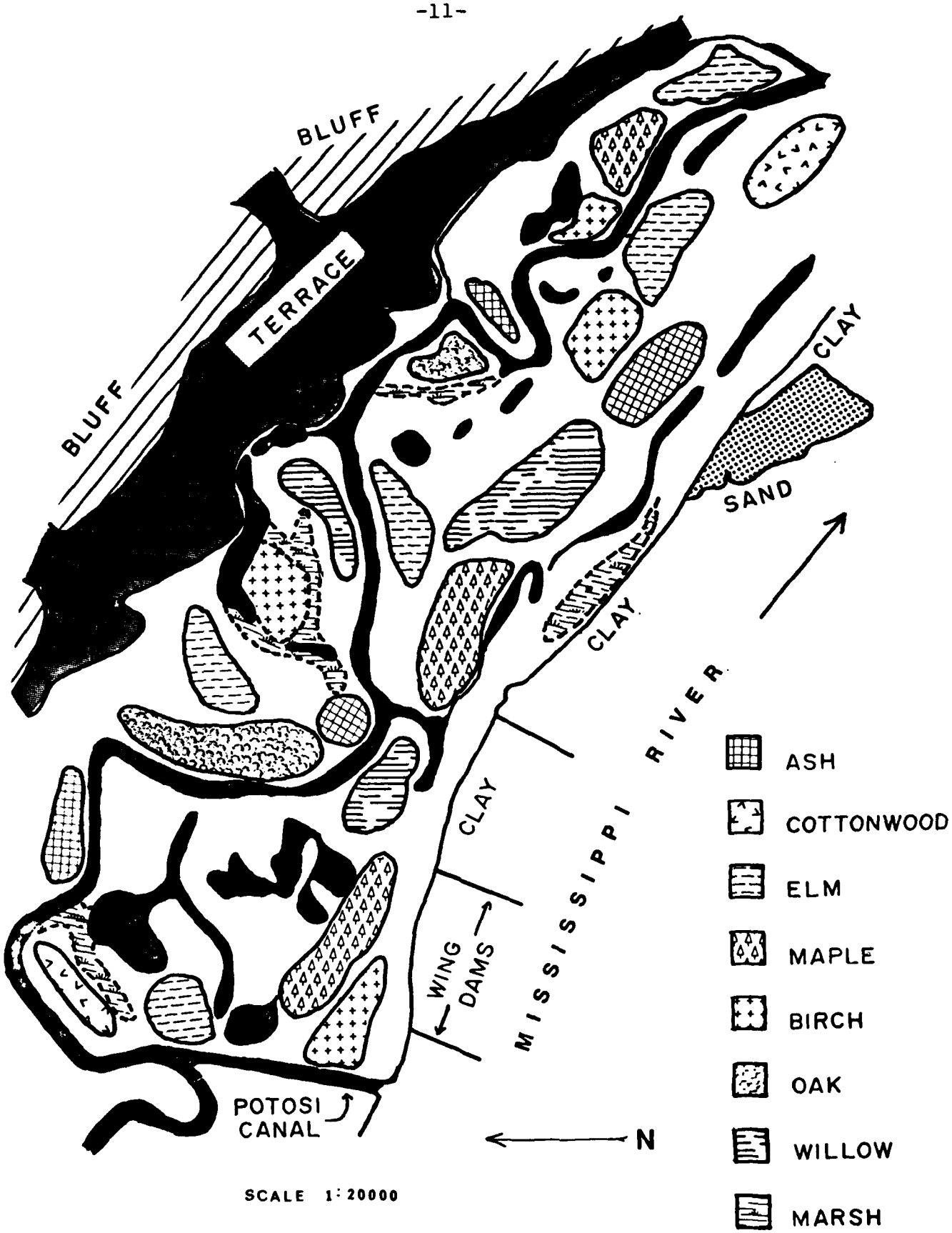

Figure 4: Environment at Close of 19th Century (1=Hog Hollow Site, 2=Osceola Site, 3=C. E. Brown uncodified campsite).

> large part this is due to a large number of species of southern derivation which have entered the state along the river valleys and are not found elsewhere. These include the smooth buckeye (Aesculus glabra), the river birch (Betula nigra), the honey locust (Gleditsia triacanthos), and the sycamore (Platanus occidentalis) (1959: 157).

Of the understory, Curtis identifies the unusually high frequency of both woody and herbaceous lianas which have the highest presence of any of the understory species. Poison Ivy, Woodbine, and Grape approximate 80%, but other vines of frequent occurrence include Moonseed, hog peanut, parasitic dodder, wild yam, clematis, groundnut, wild cucumber, carrionflower and bittersweet. Other understory components include the sedge, mint, nettle, and carrot families (1959: 161-163).

The diversity of the present habitat is now restricted by inundation. Virtually all of the landforms between the Potosi terrace and the Mississippi River indicated on Figure 3 are now permanently inundated under the lock and dam impoundment. The terraces were cultivated early in the 19th century and only a few woodlots and tree lines along agricultural fields remain. The rugged topography of the bluffs has prohibited severe modification of that element of the ecosystem.

Erosion along much of the Potosi Terrace has created a rather steep scarp. Sandy bluffs of 10-20 feet in height are undercut by wave action and large segments of the coarse sediment slump off. At the Grant River Public Use Area bank stabilization measures were undertaken in 1962. The sandy scarp was stabilized and sloped with dredge spoil. Following this, rip-rap was placed along the scarp to protect the locality from erosion.

At the Grant River Public Use Area specifically, substantial modification of the terrace topography is apparent in excavation profiles, coring logs, and from remote sensing investigations. Cut and fill activities have served to reduce some of the mild relief of the terrace surface. In some localities rubble type fill has been dumped, removing surficial evidence of a small drainage that once bisected the terrace. Most of these changes, related to development of the recreation facilities, have taken place during the last three decades.

In conclusion, natural and human agencies in the form of erosion and deposition have operated in tandem for thousands of years radically altering terrain, hydrology, and, in turn, the range and diversity of plant and animal species have also been effected. In the most general sense, these investigations were designed to attempt to identify and understand the effects on the aboriginal groups who occupied the landscape.

Current and Future Landuse:

In the early 20th century landuse at the Grant River Public Use Area was primarily agricultural. Mississippi River Commission Maps and the plane table maps compiled by the Rock Island District demonstrate that literally all of the remaining terrace has, at one time or another been subjected to cultivation. Immediately prior to, and for a short duration following government acquisition of the recreation area, other recreational and commercial ventures were pursued there. Fishing shacks or shanty's were commonplace along the river.

For the most part these were small rudimentary structures. Building materials were not sophisticated generally consisting of a dressed stone foundation, upon which a wooden shack covered with tar paper or other materials was placed. Newspaper photographs and informant accounts indicate that these shanties were generally quite small with floor space ranging from 36 to 100 square feet. The primary use of these shanties was for storage of gear by commercial and sport fishermen.

Cottage type structures are also noted on historic maps. However, following acquisition of the recreation area by the Corps of Engineers these structures were either removed, or burned in place. Bits and pieces of these structures are still visible on the surface at some localities. The shoreline along the recreation area contains late historic period artifacts including building materials as well as prehistoric artifacts which have been redeposited from shoreline erosion prior to bank stabilization.

Plans for the recreation area include the construction of a shower building, tent pads, new roads, a boat landing, amphitheater, picnic facility, caretaker's facility, and other minor improvements such as pit toilets and a playground area. As a result of these investigations, it has been determined that no significant impact on historic and archaeological resources will accrue. In fact, degradation of the resource from vandalism and all terrain vehicles will likely be diminished by the presence of an on-site caretaker.

PREVIOUS INVESTIGATIONS AT THE GRANT RIVER PUBLIC USE AREA:

Among the earliest references which identify archaeological sites at the Grant River Public Use Area are those provided by Charles E. Brown and Albert O. Barton (1916). In their review of "Grant County Indian Remains" the authors provide a rather general description of the locality and the sites noted in the area:

> Grant River Camp Sites (Secs. 11, 14, and 24). In various fields lying between the C.B. & Q.R.R.

> right-of-way and the bank of Grant River camp sites were located. One of these was near track section post No. 6, and another near the mouth of a creek tributary to the Grant, in Section 14. In some fields grain was being grown and in these no observations could be made. The chert refuse found along the edges of some of these fields cut by the right-of-way told the story of the past location of camps there. The quality of the chert found on these places was the same as that obtained on the site near La Fayette. The Grant is here a very pretty stream its banks being fringed in places with tall rows of willows and other trees. The wooded Mississippi bottom lands beyond have been and still are the retreats of raccoons and other small animals, and wild fowl. Fish of many species are numerous in the river, sloughs and small lakes (Brown and Barton 1916: 186).

These descriptions, of course, are not explicit; however, the Charles E. Brown Archaeological Atlas for Grant County indicates two campsites on the Osceola tract (see Figure 5). In these localities, cultural materials were retrieved both through the Rock Island District investigations and during the current investigations.

Knowledge of artifact concentrations at the Grant River Public Use Area derived from the development of the 9 foot channel project and construction of the lock & dam at Dubuque, Iowa. During the mid-1940's, following the inundation of the Grant River mouth and adjacent floodplain, the terrace at Potosi was subjected to rather severe erosion. Steep sandy cut banks rapidly formed and the loose matrix, quickly undercut, began to slough off into the shallows adjacent to the terrace. Local residents who frequented the area, particularly fishermen and hunters began to collect artifacts exposed through erosion.

Many large collections of copper artifacts, pottery, and stone tools were secured. Unfortunately specific provenience for most of these collections is not available. While some materials are now curated in local museums, other artifacts have been transported as far as the state of Washington to the west and the state of Virginia to the east (a list of informants is provided in Appendix D which specifies the nature and location of collections). Two local fishermen, Ralph Turner and Victor Irish reported the discovery of burials at the Osceola Site (47 Gt 24) to local historians (Mr. Edwin Goke and Mr. John Grindell, both of Platteville, Wisconsin) who in turn reported the find to the State Historical Society of Wisconsin and to the Milwaukee Public Museum.

In June of 1945 Dr. Robert E. Ritzenthaler and Mr. John Douglass of the Milwaukee Public Museum, initiated excavations at the Osceola Site. Ritzenthaler's investigations were published in 1946 in The Wisconsin

5: Campsite recorded on Charles E. Brown Archaeological Atlas.

Archeologist and had significant impact on regional interpretations of prehistory. Among the more notable interpretations were: (1) The Osceola Site was the first "Old Copper Complex" wherein copper artifacts had been recovered in excavated context; (2) the establishment of a relative chronology for the Old Copper Complex derived from the Woodland pottery fragments throughout the burial pit fill; and (3) the association of copper implements with a chipped stone industry and a burial complex.

From the undisturbed portion of the site that Ritzenthaler excavated and supplemented by information derived from local collectors, he estimated that the original burial pit extended about 70 feet along the bank and was about 20 feet wide (1957: 188). From these dimensions and from the materials both recovered and observed, Ritzenthaler "estimated the number of individuals buried here to be 500. As much of the skeletal material had been dug up and either strewn about the site or carried off before we arrived, this can only be a very rough guess (1957: 197)." No tabulation of individuals was provided in the 1946 report, however, Sullivan (personal communication) has recently analyzed the burial data from the Osceola Site (47 Gt 24) and identified a minimum number of 16 individuals based on dentition.

Of the burial patterns Ritzenthaler noted:

> The method of disposal was, with one exception, by bundle-reburial, either single or multiple. By this method the bodies are left exposed until the flesh is gone. The bones are then gathered up and buried in a more or less compact bundle. This type of burial was employed by some of the historic Plains Indians who wrapped the body of the deceased in buffalo skins, and placed it on a specially constructed pole scaffold. There was no attempt at orientation of the bones. Their condition was poor. Only four more or less complete skulls were obtained, as were a few nearly intact long bones. In many cases even the teeth, the most dense part of the human body, would crumble if held lightly in the fingers. In instances only fragments of bone were preserved due to contact with copper.
>
> Besides ordinary secondary reburial we found numerous examples of partial cremation. In three instances we found stone-capped graves, in which a layer of small stones was places (sic) directly over the burial. The one flexed burial, a characteristic Woodland burial technique, occurred at the south end of the pit with the other intrusive Woodland material. The relatively good state of preservation of the flexed skeleton indicated a much more recent interment than the Old Copper burials (1957: 198).

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING – P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

March 25, 1985

Planning Division

SEE REPORT DISTRIBUTION LIST

Enclosed for your information is the final version of the report entitled Archaeological Investigations at the Grant River Public Use Area, Grant County, Wisconsin (2 volumes). This report was prepared for us by Dr. David F. Overstreet from the Great Lakes Archaeological Research Center (GLARC) under contract DACW25-84-C-0041.

The Osceola Site (47 Gt 24) was determined eligible for listing in the National Register of Historic Places on March 9, 1984. Data recovery excavations were conducted to mitigate adverse effects from recreation development plans, erosion, vandalism, and recreational use. Prior to the GLARC investigations, the site was purported to be a single component "Old Copper" Late Archaic mortuary locality. The 500 burials excavated during the 1950's were thought to reflect typical Late Archaic mortuary behaviors for a set of sites located in Wisconsin. As a result of the GLARC work, it appears that most of the burials are Late Woodland intrusions into a relatively small "Old Copper" extractive camp. Furthermore, remains from the Paleo-Indian, Early Woodland, Middle Woodland, and Oneota periods also were recovered. A major contribution of the study is the clarification of complex Holocene geomorphological sequences in relation to the various occupations spanning an 8,000-year period of prehistory.

A limited number of additional copies are available at the District Office. The report will be covered by the Defense Technical Information Center for more

widespread distribution. For additional information, please call Mr. Charles Smith at 309/788-6361, Ext. 349, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

for James T. Schnerre
Acting Chief, Planning Division

Enclosure

ARCHAEOLOGICAL INVESTIGATIONS
AT THE
GRANT RIVER PUBLIC USE AREA
GRANT COUNTY, WISCONSIN

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7509 West Harwood Avenue
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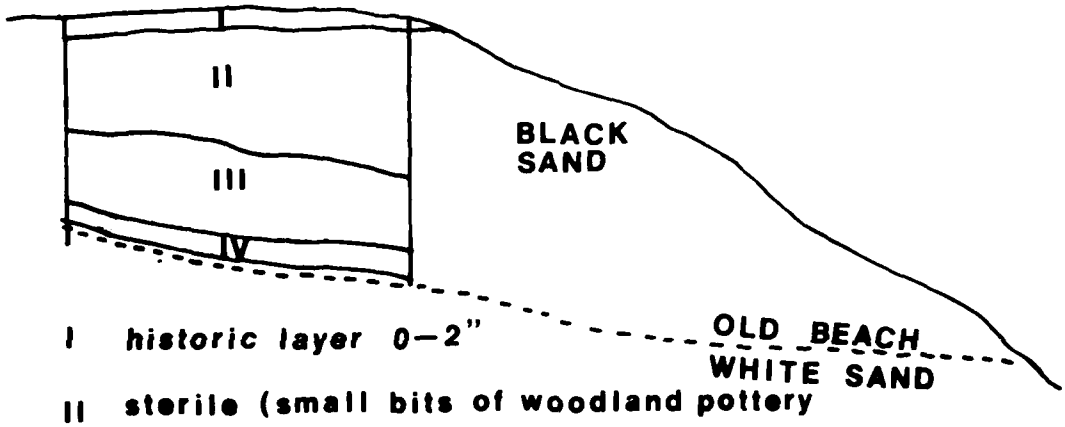
Ritzenthaler described two strata at the Osceola Site (1957: 188). These two units consisted of a layer of black sand from the surface to a depth of approximately 5 feet. Below this a stratum of sterile "old beach of white sand" was encountered. Figure 6 depicts the profile from the 1945 field notes. The burials and most of the artifacts were recovered from about 2.5-5.0 feet below the surface in the black sand layer. Ritzenthaler notes:

> All copper and most of the other artifacts were found in this bundle-burial layer. The artifacts were scattered through the bundle-burial layer, in some cases associated directly with a burial, but in most cases unrelated. The scattering of broken implements, chert chippings, and pottery fragments from a few inches below the turf all the way down to the old beach level indicated that the fill had been taken from a campsite, a Woodland campsite on the basis of the Woodland pottery fragments (1957: 188).

In 1958, Ritzenthaler reported the results of radiocarbon assay obtained from human bone from the Osceola Site. The test performed on human skeletal remains found in association with copper artifacts yielded a date of 3450 250 years B.P. The sample provenience is burial 5, 2.5-5.0 foot depth (M-643, Crane and Griffin 1959: 177-178). Ritzenthaler expressed surprize regarding the recency of the Osceola date.

On a regular basis, perhaps accelerated subsequent to Ritzenthaler's excavations (1946), relic collectors continued to retrieve artifacts from the Grant River Public Use Area. Most collecting was done from fore shores during low water stages. However, reports of uncontrolled digging are also commonplace. Most of these efforts to dig for artifacts were terminated when bank stabilization with rip-rap was completed during the 1960's. Many local collections have been documented as a result of our investigations and provide quite useful insights regarding the occupational history of the site. As one would expect the provenience of these collections is quite variable. As an example, the collection of Mr. Richard Audetat is quite precise and has been cataloged. Another collection consists of a 5 gallon pail of projectile points and preforms noted only as being collected from the Osceola Site which in reality consists of an approximate one-half mile reach of the shoreline. A list of informants and records of collections can be found in Appendix D of this report.

Following a thirty year hiatus, formal archaeological research again began at the Grant River Public Use Area locality. In 1975, students and staff from the University of Wisconsin-Platteville initiated a program of survey and excavation along the Mississippi River in Grant County



I *historic layer 0—2"*

II sterile (small bits of woodland pottery & chert chippings) 2—34"

III bundle burials (many disordered bones in poor condition) 34—60"

IV old copper 60—63"

NOT TO SCALE

Figure 6: Profile of Osceola Site (47 Gt 24), adapted from Ritzenthaler's 1945 field notes (see appendix A).

(Geier and Loftus 1976). One of the survey units which were scattered from roughly Cassville, Wisconsin to Dubuque, Iowa included the Potosi Terrace. This survey project had four stated goals: (1) to gain clarification of the sequence of cultural units occupying the study area over time; (2) to study the manner in which the various prehistoric societies distributed themselves within the environmental frame provided by the valley; (3) to gain information on the loss of prehistoric and historic sites caused by the construction of Pool 11; and (4) to evaluate the current threat of loss to remaining archaeological resources in the area.

Numerous previously reported sites were relocated and collected and a substantial number of heretofore unknown sites were identified. Attempts were made to associate particular cultural periods, e.g., Paleo-Indian, Archaic, Middle Woodland, with defined environmental/ecological variables. Based on the position of archaeological sites from which diagnostic artifacts were recovered, several preliminary observations were stated with regard to settlement patterns throughout the prehistoric continuum.

Particularly germane to the Osceola Site are Geier and Loftus' interpretations of Archaic settlement systems:

> Only five Archaic sites are identified (two in Sa-II and three in SA-III), one being the Osceola site, a major Old Copper Cemetery site. Given the large estimate of burials at the cemetery (500 suggested by Ritzenthaler 1958: 197), the small number of habitation sites and their restricted distribution in the five survey areas is interesting. While the Osceola cemetery is placed on a secondary terrace of what had been the Grant River in SA-III, the heaviest concentration of cultural debris occurs on the high benchland north of the junction of the Platte and Mississippi Valleys in SA-II. No habitation sites were found near the Osceola site and only one upland unit was identified (in Sa-III).

The authors also state:

> While the small number of sites in the study area prevents clear interpretations of Archaic settlement behavior, when combined with data obtained in 1974, certain statements can be made. Archaic activities were riverine in orientation, though, despite the burial complex on the banks of the Grant River in SA-III, the settlement emphasis apparently bypassed the Mississippi Valley proper in favor of associated tributary streams such as the Big Platte (Geier and Loftus 1976: 97).

Finally, in their summary of the survey investigations, Geier and Loftus conclude:

> Archaic indicators present a curious, somewhat contradictory situation. On one hand one of the largest Archaic burial sites in North America is placed on a sand terrace overlooking the Grant River in SA-III. On the other hand, there are few habitation sites within the study area. My interpretation is that the Mississippi Valley was only marginally occupied by Archaic populations whose settlement behavior emphasized a seasonal utilization of the narrow tributary creeks and streams that entered it. While economically marginal, the Osceola cemetery within the Valley area was apparently a focal point for burial activities, many generations of individuals apparently being buried at the site.
>
> A radiocarbon date from the Osceola site (M-643, 1500 B.C. 250) suggests that the most extensive Archaic activities occurred relatively late in the Archaic Period. While Old Copper influences are well represented in burials at the site, finds of copper artifacts are not widespread in the surrounding area, lithic tools serving as the primary indicators of Archaic activity (Geier and Loftus 1976: 120).

Excavations by University of Wisconsin-Platteville were focused at the Hog Hollow Site (47 Gt 266), immediately north of the Grant River Public Use Area and in Federal ownership. Reported by Geier as a single component, transitional, Middle to Late Woodland community, he states:

> Excavations indicate the site to be of potential importance in answering questions concerning the transitional Middle/Late Woodland period in southwestern Wisconsin, possibly being associated with the emergence of the Effigy Mound Culture in that area. The artifact assemblage at the site is unique, including associations of Middle Woodland pottery and lithic tool types in direct, contemporaneous association with traditionally identified Late Woodland types (1978: 151).

Interpretation of the Hog Hollow Site as a reflection of a single component is based on Geier's interpretation of site stratigraphy. He suggests: "Stratigraphy, the vertical and horizontal association of features, and the distribution of cultural debris, suggests that the site has only a single cultural component. No overlapping features were identified and each has essentially the same stratigraphic relationship (1978: 157)." Of additional notable interest is the identification of a buried plow zone, a developing "A zone" subsequent to its last period of agricultural use, and coarse

alluvial materials on the surface ostensibly deposited during a 1975 flood stage of the Mississippi River (1978: 157-161, see also Figure 7).

From Geier's ceramic discussions and from his illustrations of various vessels a number of wares can be readily identified (1978: 176-217). The earliest ceramics at Hog Hollow can be accommodated with ease in the incised over cordmarked style. Such forms as Dane Incised, Black Sand Incised, and various Prairie types fall within an Early Woodland framework. Recently radiocarbon dated examples have been reported from the Mill Pond Site by Theler (1983) with an age of circa A.D. 100.

Subsequent to the Prairie Ware grouping (Stoltman 1983) which includes such characteristics as incised lines, bosses, nodes, and fingernail impressions occurring alone or in combination on sandy-pasted vessels, several Havana-related ceramic forms are noted. Readily identifiable types such as Sister Creeks Punctated and Naples Stamped, variety dentate, as well as other Middle Woodland categories are well represented. Sherds with rocker-stamped bodies and cord impressions applied to a smoothed surface indicate a very likely Lane Farm component at the site. Finally, Madison Ware is in great abundance at Hog Hollow. Thus, one would conclude, based on the presence of well defined Early, Middle, and Late Woodland ceramic types that the Hog Hollow site harbors more than a single prehistoric component. Geier, however, interprets this diversity in the ceramic assemblage as the result of factors other than multiple components. His summary is as follows:

> Based on distributional studies and references to excavation notes, a number of observations can be made which relate to the assemblage, its composition, and its relation to other archaeological features.
>
> 1. Identified archaeological features such as trash pits, middens, houses, etc., were consistently identified in the same stratum. No overlapping features were noted.
>
> 2. Except for localized rodent and turtle nesting activity and the effects of lateral erosion along the shoreline, no substantial disruption of the site matrix was in evidence. The turtle activity was limited only to the Plowzone.
>
> 3. Fifty-nine percent (59%) of the total pottery fragments found were in a 7-8 inch zone that was associated with the original occupation floor of the site. Another 19% were located in a 3-4 inch stratum below the floor. Archaeologically this includes Strata A + 1, A, and A-1. Within this band, 91% of the stamped

pottery A+2 (22%), A (51%), A-1 (19%), 89% of the incised-over-cordmarked wares (A+1 (26%), A (50%), A-1 (13%), and 93% of the Cord Marked pottery A+1 (41%), A (41%), A-1 (11%) was found.

4. The distribution of sherds from specific vessels (See Table 1 and Figures 9-13) shows that even though fragments of these vessels can be found in all excavation levels (particularly Strata A+1, A, and A-1), horizontally the sherds occur in definite, often mutually exclusive patterns of concentration.

5. Sherd distributions indicate that specific vessels and categories of vessels appear to have meaningful and differential associations with the large house feature, possibly suggesting functional differences.

6. Finally, all of the above observations strongly argue for a single site component and for the contemporaneity of the pottery assemblage.

> The time period over which the identified pottery types occur reflects the persistence of their respective manufacturing and decorating strategies. Of the traditions noted in the site assemblage, Incised-Over-Cord marked and Havana are probably in their latter stages of expression; a third, Madison tradition, is probably in an early period of use. In effect, the Hog Hollow assemblage may represent an interface of the three established pottery traditions (1978: 218-219).

In March of 1983, attention was again focused on the Osceola Site burial population. Norman C. Sullivan conducted both an inventory and description of the human skeletal remains from the site and analyses of enamel hypoplasia in the dental remains of the burial population (1983a, 1983b). With regard to the number of individuals Sullivan states:

> At the time of the excavation the deposits were thought to contain as many as 500 burials. The skeletal remains had been mixed because of the disturbances and, therefore, this estimate of size of the skeletal series was little more than a guess. The recovery of skeletal elements was substantially short of the estimated total. The most commonly occurring element is the right mandibular first molar which is used to provide an estimate of the minimum number of individuals. Based on tabulations of this tooth, it is suggested that

> there are at least 16 individuals represented in the collection. This number is, if anything, an underenumeration since there were a number of molar teeth that could not be identified with regard to position in the dental arcade (1983a: 1).

Sullivan's analyses also include observations of anomalous skeletal remains, measurements, and a brief discussion of pathology.

The analyses of enamel hypoplasia reveal some interesting characteristics with regard to the Osceola burial population. Comparisons indicate stronger similarities between Mississippian and Osceola samples than between Kentucky Archaic populations and Osceola. Sullivan states:

> The rates of enamel hypoplasia in the Osceola Site dental material are directly comparable to data from Powers Phase Mississippian skeletal remains (Black 1979). The Mississippian people were engaged in an agricultural economy and lived in societies characterized by higher population densities than the Archaic period hunters and gatherers. The incidence of hypoplastic defects on the canine is somewhat higher for the Powers Phase people (94%) than at the Osceola Site (90%). However, the rates are higher, for all of the cheek teeth, in the Osceola Site dental remains than in the Powers Phase samples. Black observed an incidence of 36% on both of the premolars, considered simultaneously, as opposed to 65% on the Osceola molars. Similarly, there is a higher incidence of hypoplastic defects on the Osceola molars (51%) than on the combined molars from the Powers Phase burials (36%).
>
> These differentials may be a reflection of a greater security of the resource base among the Mississippian peoples. Beyond this, it is possible, given the population size differences and inevitable differences in the disease load, that the cause of enamel hypoplasia among the Osceola Site people was largely due to nutritional stress whereas it may have been due to increased rates of disease in the Mississippian population (1983b: 5).

The most recent investigations, prior to those detailed in this report, at the Osceola Site were conducted by the Rock Island District, U.S. Army Corps of Engineers under the direction of Mr. Charles Smith. A total of 29 test units were excavated at the Grant River Public Use area to determine the vertical and horizontal extent of remaining cultural deposits at the site. Archaic and Woodland artifacts

were recovered from many localities at the public use area (refer to Figure 1, Appendix A). Diagnostic artifacts include projectile points and pottery sherds, some of which were recovered from a depth of 1.45m below the present surface. Based on the testing results conducted by the Rock Island District, the volume of matrix containing cultural deposits is indeed substantial. Estimates of this volume indicate 1.8 million cubic feet of cultural deposits. Testing of the Grant River Public Use Area by Rock Island District personnel also resulted in a determination by the Secretary of the Interior that the property is eligible for The National Register of Historic Places. The determination was made on March 19, 1984.

GOALS AND OBJECTIVES OF THE ARCHAEOLOGICAL INVESTIGATIONS:

As previously noted, complete recovery of the archaeological data at the Grant River Public Use Area was not feasible. Earlier investigations at the recreation facility indicated that the site was extensive and that artifacts were situated at considerable depth below the present surface (Ritzenthaler 1946, Geier 1978, Rock Island District investigations, Appendix A). The collective results of these investigations were of substantial utility in developing the research design which guided the present excavations.

Ritzenthaler's description of the stratigraphy at the Osceola Site (47 Gt 24) indicated that approximately 5 feet of black sand was situated atop an old beach of white sand, the latter stratum apparently culturally sterile (1946). Geier's excavation report at the adjacent Hog Hollow Site provided a stratigraphic description decidedly distinct from Ritzenthaler's. In his report Geier noted the presence of alluvial materials recently deposited at the site and defined 4 separate strata: (1) a dark sandy A horizon; (2) a dark grey/black soil; (3) an orange/brown mottled sandy soil; and (4) a bright orange/yellow sand (1978: 159-161).

Recent investigations conducted by Rock Island District personnel (see Appendix A) presented a third stratigraphic record. They note:

> The stratigraphic correlation of the cultural deposits at Grant River with the deposits at the Hog Hollow Site have been a major concern of Rock Island District staff. When excavations commenced at Grant River, a dark brown, almost black, sandy soil was encountered just beneath the sod to a depth of 40 cm in the area closest to the river bank. Our initial assumption, that the cultural deposit would be confined to this black soil, had to be abandoned when cultural material continued to come from the underlying reddish-tan sand. In Test 29, the deepest excavation, this reddish-tan sand, gave way to a light tan sand at a depth of

96 cm below the ground surface. This soil continued to a depth of 290 cm. Below this a change to a dark brown clay/sand with banding was observed (RFP No. DACW25-84-R-0035).

These contradictions could result from a variety of factors. First, as suggested by Geier (1978) variation in stratigraphy could be the result of vertical and lateral accretion processes associated with sediment deposition from flood episodes. Second, the variation in color and texture noted in various investigations could simply represent differences in macroscopic observation of soil strata. And, third, the terrace soils may not have been subjected to flood related deposition and variation would have derived from eolian reworking of earlier (Pleistocene or Early Holocene) matrix. If the first two alternatives were correct, we could expect intact, stratified cultural deposits. If the latter phenomenon were the case, deflation would have made it very difficult to interpret cultural strata across the terrace.

In light of these considerations, the Scope of Work, and subsequent technical proposal, were designed to fulfill multiple objectives. Noted in the introduction of this report, the first objective was the establishment of horizontal and vertical controls over the recreation area in order to integrate proposed development plans with archaeological investigations, to precisely delineate the boundaries of archaeological deposits, and to provide a detailed record of investigations related to the geomorphic history of the site.

The second objective was to attempt verification, and redefinition where possible, of the site matrix that harbored potentially significant archaeological and historical data. A variety of methods and techniques were employed in realizing this objective and included auger holes, test excavations, remote sensing (ground penetrating radar and resistivity, supplemented by metal detecting in submerged areas), surface collections, and informant interviews.

A third objective was to provide a detailed summary of the site formation processes utilizing the methods and techniques cited for the objective above coupled with historic mapping information. It was apparent that if we were to reconcile the variances in reported stratigraphy a comprehensive geomorphic history of the terrace and now-submerged landforms associated with the Grant River would have to be compiled. Furthermore, significant historical landscape alterations had resulted from lock and dam construction, railroad development, mid-19th to early-20th century agriculture, and cut and fill activities associated with development of the recreation area.

This objective required work site-specific to the recreation area, but also included investigations at other localities on the terrace such as the Hog Hollow Site, a large fan near the recreation area, and in and along small

drainages on the terrace. The goal here was to ascertain landscape changes during the prehistoric occupational sequence to provide a more reliable interpretive framework for the archaeological data.

Block excavations represented the fourth objective. The primary purpose of these excavations, in addition to the obvious relationships to site stratigraphy, was to attempt to clarify the historic and prehistoric components at the recreation area. Should stratigraphic separation of components be possible, we sought to isolate cultural assemblages in order to document differing land-use patterns of the terrace during the Holocene. Stratigraphic separation of course was necessary to allow for meaningful comparison of adaptive strategies as reflected in each component at the recreation area.

Test excavations were situated at proposed areas of direct impact from camp facilities construction. Thus, the locations of buildings, toilets, tent pads, roads, and a boat ramp were evaluated prior to construction.

A fifth, and comprehensive objective, was the evaluation of the data recovery investigations and their potential for reinterpretation of the Osceola (47 Gt 24) and Hog Hollow Site (47 Gt 266). Detailed in the scope of work (Appendix A), the archaeological investigations were to be designed to address the hypotheses relating to Woodland chronology, development, and ceramic technology proposed by Geier (1978) and, interpretations of the "Old Copper" type site (Ritzenthaler 1946).

The last objective related to long-term management of the archaeological deposits at the Grant River Public Use Area. Total recovery of the entire site matrix is not feasible. Objective six has as its goal the identification of methods for preservation in context of the remaining site area. In addition, consideration was to be given to interpreting the resource. This is particularly suitable because of intense local interest in the locality and evidence of lengthy occupation of the recreation area by prehistoric inhabitants.

METHODS AND TECHNIQUES OF INVESTIGATION:

The following methods and techniques of investigation were employed during the course of archaeological investigations at the Grant River Public Use Area. In some instances exclusively, but more often in tandem with other techniques, the methods of data acquisition summarized in the following narrative were selected as those best suited to fulfill the objectives required by the scope of work and those stated in the technical proposal.

Archives and Literature Search:

Literature relevant to the Grant River Public Use Area was reviewed and much of the published data have already

been cited. In addition to these sources, archive materials useful to data interpretations at the Osceola and Hog Hollow Sites are substantial. For example, various newspaper articles were published during the time of Ritzenthaler's excavations. These newspaper accounts provide illustrations of cultural materials not depicted in other sources and also portray the site setting at the time of the 1945 excavations and the excavation units.

Another important source of information is the museum collections which include artifacts specifically from the burial locality excavated by Ritzenthaler (1946) and from less specific provenience on the Potosi terrace. The two major repositories are the Milwaukee Public Museum and the Rollo Jamison Museum in Platteville, Wisconsin.

Finally, perhaps the most significant archive source is the field notes compiled by Ritzenthaler during the 1945 excavations. The notes are currently housed at The Milwaukee Public Museum. Appendix D includes copies of newspaper accounts and the 1945 excavation field notes.

Informant Interviews:

Local Potosi residents and those in surrounding areas have keen interest in the Grant River Public Use Area archaeological resources. More than 15 private collections were examined and photographic records were compiled for each collection. Surprizingly, only a few of the collections have been broken up and dispersed. Most informants indicated that they had no intention of selling and disposing of artifacts. Several collections, particularly the materials compiled by Mr. Richard Audetat, Bloomington, Wisconsin are accurately provenienced.

Older residents, notably Mr. Joseph Doser, "Grandpa" Ames, and the Kaltenback family, have specific knowledge of the location of the Osceola burial site. They visited the recreation area and identified the location of the 1945 excavations.

A list of informants is provided in Appendix D, and a representative sample of cultural materials from private and museum collections is presented in a subsequent discussion of the occupational history of the Grant River Public Use Area.

Historic Mapping Procedures:

In order to assess post-lock and dam changes in the landscape at the recreation area, the Mississippi River Commission Maps, constructed at a scale of 1:20,000 were modified to a more detailed scale. Scale conversions were accomplished with the aid of a Kail Reflecting Projector and Mapograph. Depicted in Figure 7, the Commission map portrays the late 19th century topography of the Potosi Terrace and associated landforms of the Grant River. Figure 8 notes aquatic features, cultural features, and vegetation

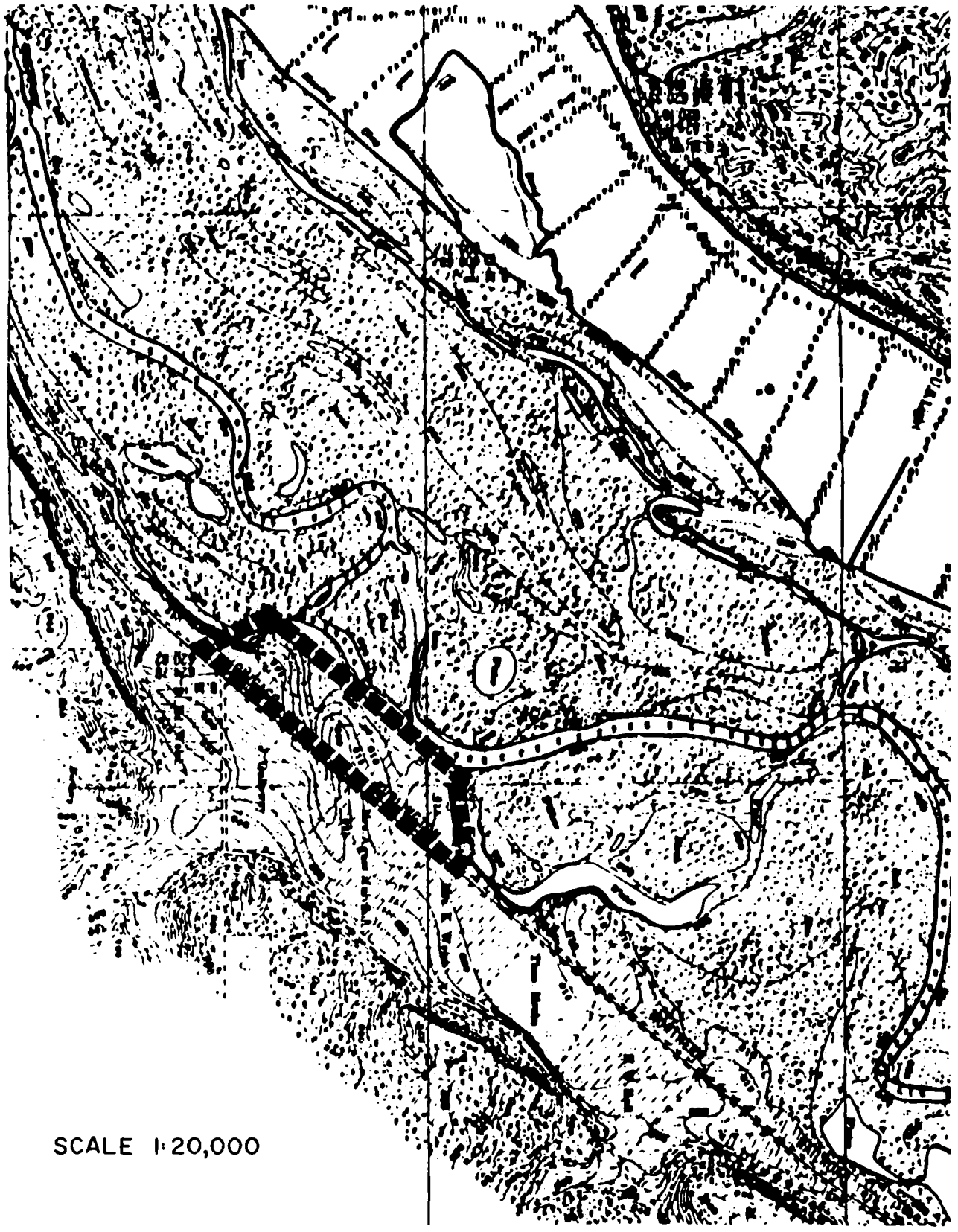


Figure 7: Topography pre-lock & dam, (source is Mississippi River Commission, Chart 162, 1893)(■■ indicates Grant River Public Use Area).

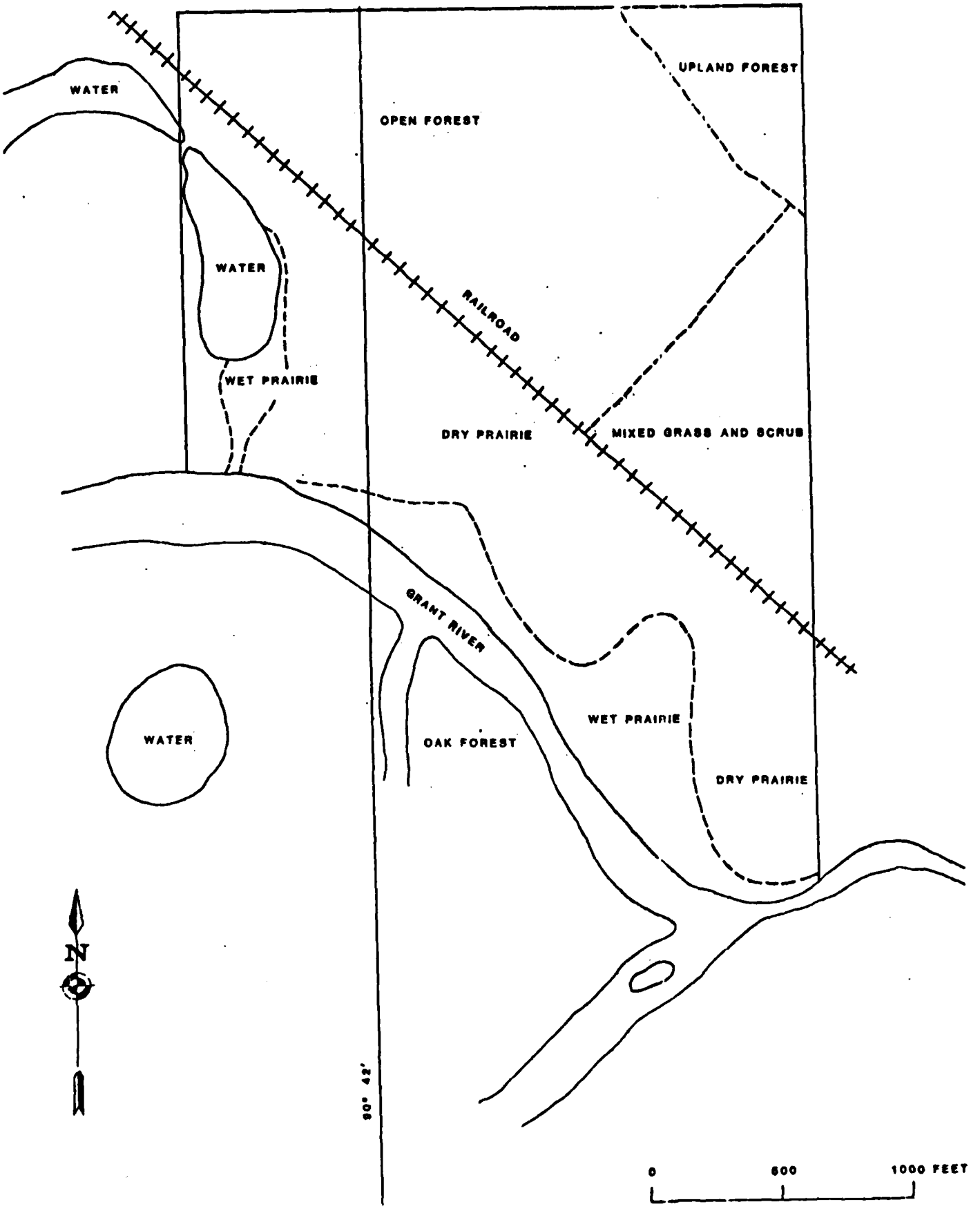


Figure 8: Detail map, aquatic, vegetation, and cultural features in 1893.

derived from the Commission map. The assumption here is that we would be able to place archaeological and historic data in pre-inundation topographic and geomorphic contexts.

Ground-based Remote Sensing:

Data were collected with three ground based remote sensing techniques: (1) ground penetrating radar, (2) resistivity, and (3) with a submersible metal detector.

Ground Penetrating Radar:

Instrumentation used for this application was an SIR System 8 manufactured by Geophysical Survey Systems, Inc. This system consists of a control unit, transducer (radar transmitter, receiver, and antenna), a graphic chart recorder, and a magnetic tape recorder. The equipment was operated on 12 volts DC which was supplied by power cable attached to an equipment truck.

Radar transducers operating at different frequencies and wave lengths can be used with this equipment. In general, lower transducer frequencies will yield greater depth of penetration of the radar signal, while higher frequencies, although not able to penetrate the earth as deeply, provide the highest resolution. This higher resolution allows the higher frequency transducer to discriminate between closely spaced objects and interfaces. The antenna used for this study operates at a center frequency of 50 megahertz. This transducer provides adequate depth penetration while maintaining good near surface resolution.

In operation, a brief pulse of electromagnetic energy is directed into the ground. When this energy encounters an interface between two materials of differing dielectric properties, a portion of the energy is reflected back to the transducer. The reflected energy is received by the transducer and processed within the control unit where it is amplified and the time differential between initial transmission of the electromagnetic pulse and the reception of the reflected wave is determined. The electromagnetic wave travels through the medium at a velocity dependent upon its dielectric characteristics, so the time differential can be converted into depth. This requires knowledge of the dielectric constant of the medium, or, more commonly, on site determination of the depth of a visible radar target. The electromagnetic pulse is repeated at a rate of 50 kilohertz and the resultant stream of radar data is sent to the chart recorder where a continuous hard copy profile of the data is produced as the transducer is moved along the surface. Figure 9 portrays a profile from the Grant River Public Use Area.

At the control unit, the operator has an oscilloscope display upon which the reflected wave form can be continuously monitored. Controls are also available which are used to adjust and optimize the wave form to produce the

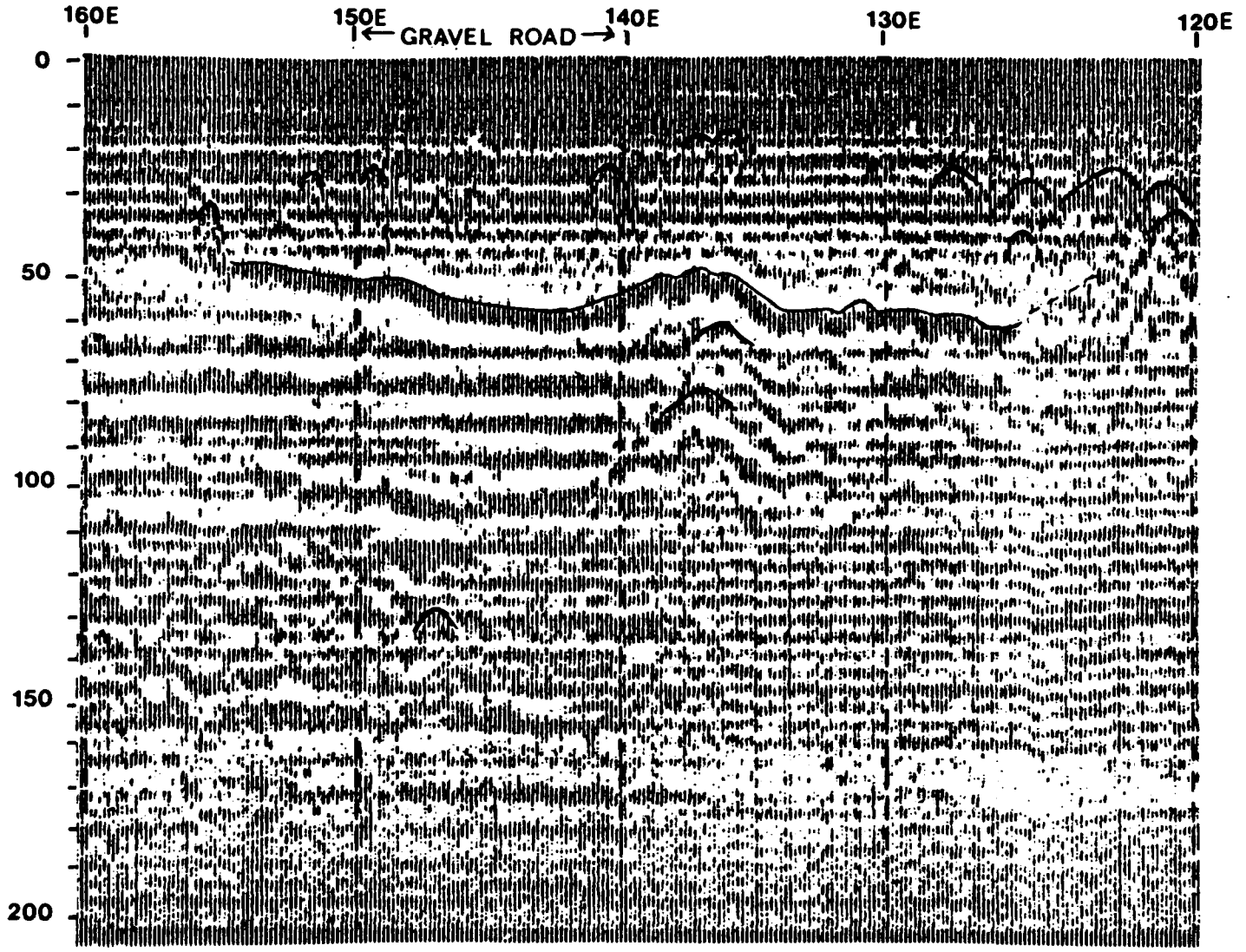


Figure 9: Radar Profile denoting sub-surface anomalies at locality of Unit 28, Area D, Osceola Site (47 Gt 24).

best output on the graphic chart recorder. In addition, wave forms are recorded on a magnetic tape and can be later reproduced in the lab. This allows for data reduction and computer generated enhancement of the radar profiles in the laboratory.

This remote sensing technique was selected for the Grant River Public Use Area as it was much more cost effective for an area of this size than more traditional archaeological techniques. Following establishment of the grid system at the recreation area, radar transects were established at 10m intervals over the site. In two instances of proposed direct impact, tighter intervals were employed.

Resistivity:

Electrical resistivity was applied at one location to investigate the lateral extent of an archaeological deposit. Historically, resistivity has been applied for the exploration of mineral deposits. However, it has also been used for delineating near surface archaeological features such as storage or refuse pits, middens, and house floors all of which may have a differing resistivity than that of the surrounding soil.

Resistivity is defined as the measure of opposition to flow of an electrical charge in a medium and is recorded in units of ohm-meters. Resistivity techniques introduce a direct current (DC) into the ground with interpretations based on DC theory. Four electrodes are driven into the ground: 1 pair of electrodes serves to introduce the electrical current and the other pair measures the resultant potential difference. Near the earth's surface, most conduction of electricity through rock occurs as electrolytic conduction. Therefore, the magnitude and distribution of the current is a function of the amount of water present in the pore spaces, the salinity of the water, the rock-pore interconnections, and the rock type and physical characteristics. Typically, dry sands and gravels (the matrix at the Grant River Public Use Area) have high resistivity values while clay soils have lower resistivities. It was suspected that the area which contained identified concentrations of cultural material would have a higher resistivity because of its coarser texture.

In this investigation electrical profiling was used to determine lateral changes in subsurface apparent resistivity. Measurements were accomplished using the Wenner electrode array. The electrodes are positioned at equal distances with the current electrodes on the outside and the potential electrodes on the inside. The reading is assumed to be taken in the center of the array (Figure 10).

The equipment utilized for the survey was a Johnson-Keck model IC-69 Shallow Earth Resistivity Meter. The electrode A-spacing selected was 1 meter with a total depth spread distance of 3.0m. An approximation of the depth pene-

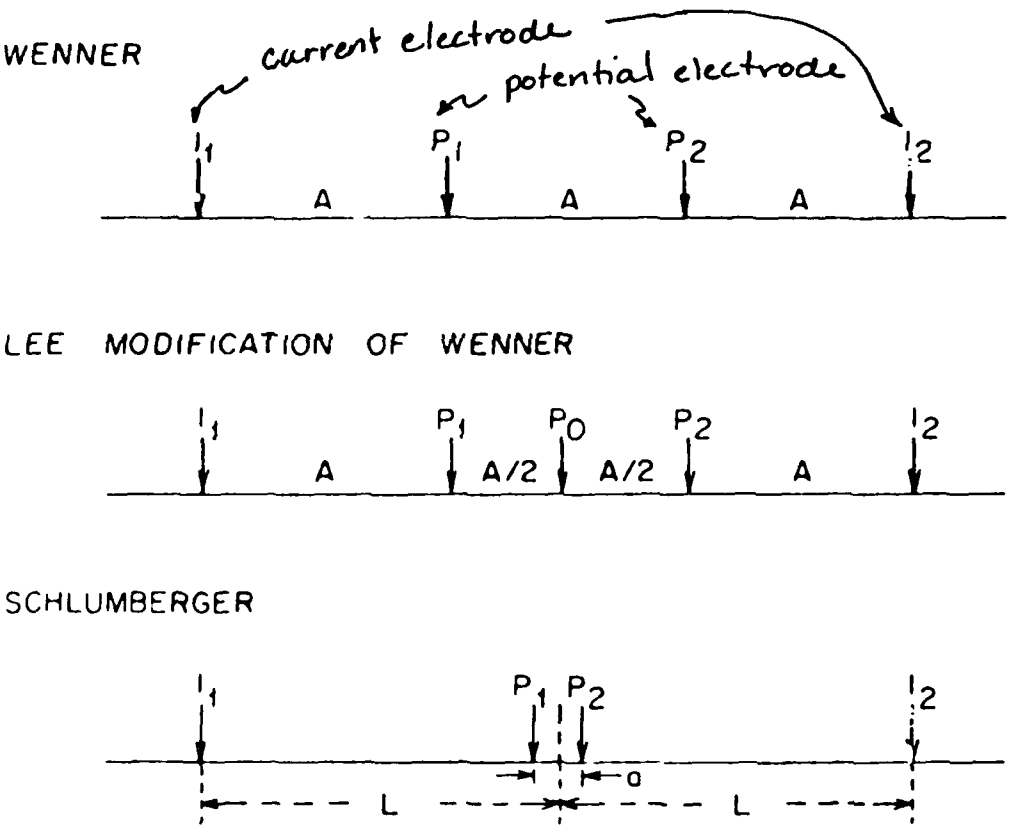


Figure 10: Seismic Electrode Arrangements.

trated with this electrode spacing is one-third the total distance or 1.0m.

Resistivity values are non-unique determinations. The measured or apparent resistivity is dependent on the variables mentioned above. However, natural resistivity for a specific formation may remain within a small range of values over a given area. At the Grant River Public Use Area, it was determined by coring investigations that the recent (Holocene-Late Woodfordian) geologic materials were relatively homogeneous over the area being investigated. Resistivity differences caused by changes in the geologic materials could be accounted for through test pit and hand boring information.

Three survey traverses were run parallel to the Mississippi River shoreline. These are labeled Line 1 through 3 (see Figure 11) with line 3 closest to the shoreline of the river. Traverses were initiated at the north end of the line and continued for a distance of approximately 60.0m. This resulted in a total of 160 readings at the site.

Submersible Metal Detector:

The burial locality excavated by Ritzenthaler (1946) is now permanently inundated and depth of the water ranges seasonally from 2-6'. A submersible metal detector was employed in hopes of relocating copper concentrations that would pinpoint the 1945 excavations, or, reveal other possible associations of copper and human remains.

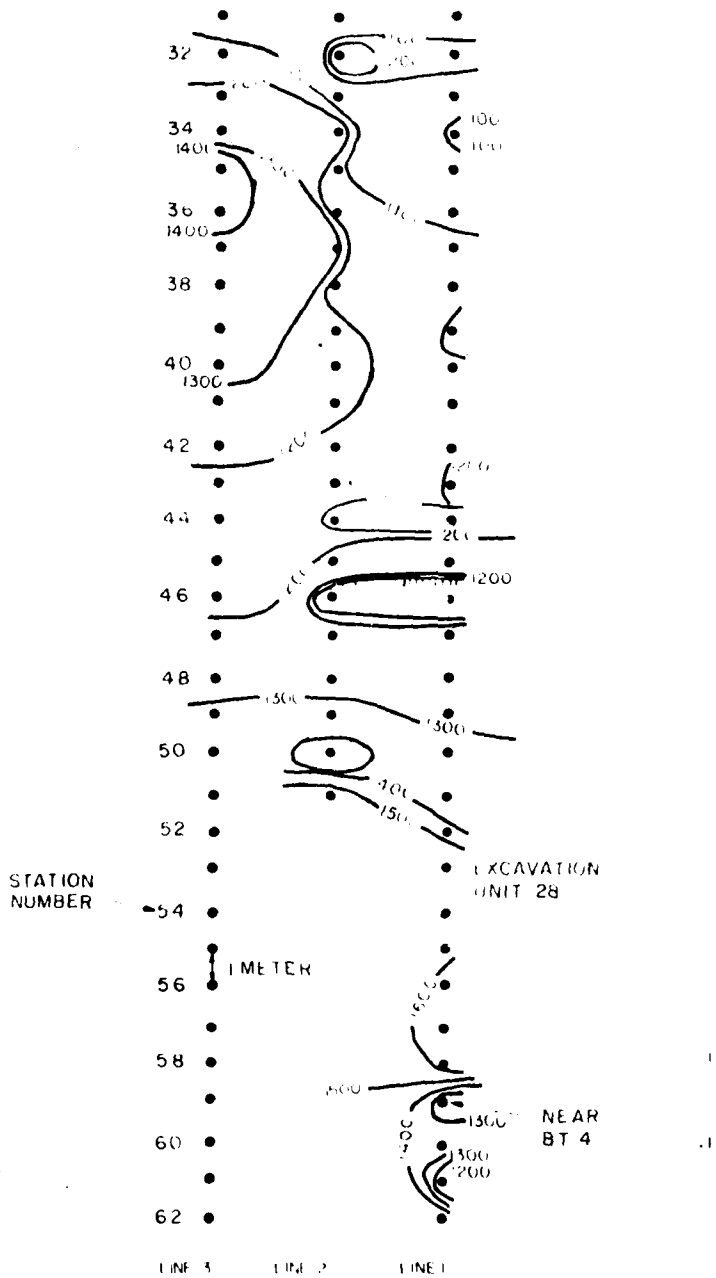
A grid network was established and collected in approximate 10m blocks. At the same time, other cultural debris was noted and its locality recorded. These investigations were not tightly controlled as frequent digging and sifting of silts and sands had been reported by local informants. The extent of collecting has been substantial and it is likely that any concentrations of cultural debris reflect the dumping of lithic debris and other cultural materials after formal artifacts had been recovered.

Geomorphic Investigations:

A combination of techniques were utilized to provide information relative to the geomorphic history of the Potosi Terrace. These include ground based remote sensing, hand tools, and techniques of soils analysis.

Remote Sensing:

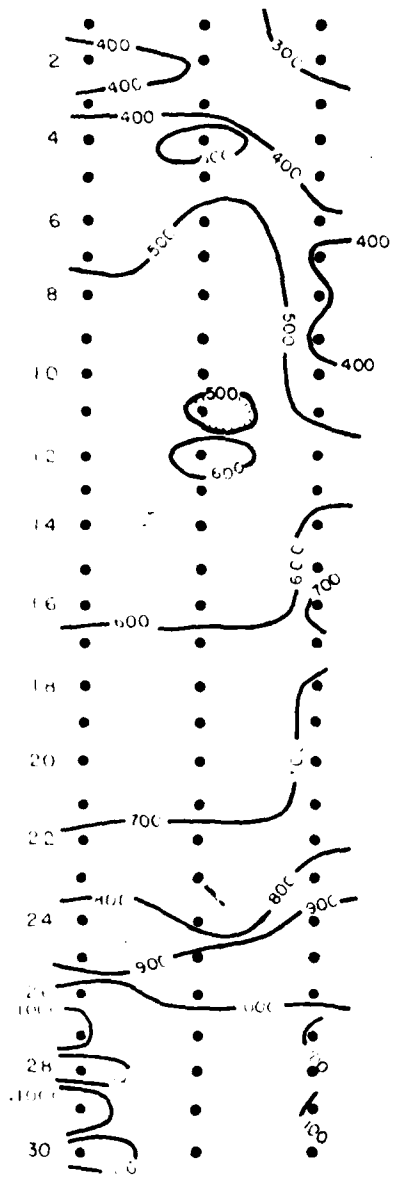
Initial ground penetrating radar runs were calibrated to secure data at depths of 8 or more feet below the surface. The purpose of these investigaitons was to evaluate the homogeneity of the terrace matrix. If different sized sediments such as mixed sand and gravel,



RESISTIVITY CONTOUR MAP

OSCEOLA SITE

FIGURE 11



VALUES ARE RESISTIVITY IN OHM-METERS

100 OHM-METER CONTOURS.

tightly compacted gravel, or silts from now obscured drainages were present, such anomalies would have been apparent on the strip charts as interfaces. This initial geomorphic work also allowed for a critical evaluation of penetration capabilities of the radar at the Grant River Public Use Area.

Soil Coring:

Soil coring was conducted exclusively with hand tools. Utilizing an Oakfield Tool or silt probe and a three-inch bucket auger, cores were placed along the terrace parallel to the river. Oakfield tools, although more quickly utilized than bucket augers were abandoned as the coarse sediments and pockets of gravel prohibited their use at necessary depth. Thus, the vast majority of cores were recorded with the bucket auger. Elevations of the auger holes were recorded with a transit, and, each auger hole was located on the site grid. A total of 86 bucket auger holes were dug across the terrace. The holes followed along the established grid system. Soil profiles were described and in some cases sampled from the north end of the park to the south 300m grid line. All of the unit excavations were described and some of the units were sampled at 10cm intervals for future lab analysis. Soil color, texture and structure were recorded in addition to the testing for carbonates.

One of the ancillary goals of the research was to evaluate the use of ground penetrating radar. The radar anomalies were tested by coring the location where the anomaly was observed. The following table represents what was interpreted to be the anomaly.

TABLE 1

ANOMALY CONFIRMATIONS

Anomaly Source	Clay	Gravel	Roots	Cultural	Undetermined
Frequency of Occurrence	14	41	15	13	8

* Note: some holes contained more than one possibility i.e. a hole may contain cultural material at 50 cm and gravel at 200cm.

Soil Analyses:

Two primary analytical techniques were used in the field investigations. These consisted of microscopic observation (binocular microscope at 40x) and chemical tests with a dilute solution of HCL. These field tests were run for two purposes. First, the microscopic observation was designed to differentiate between wind-blown and water-laid coarse sediments, a phenomenon not observable macroscopically. The latter test was applied to identify the calcareous nature of sediments, a key to the identification of presettlement and post-settlement (ca. A.D. 1850) alluvium, the latter generally being highly calcareous. The calcareous nature is associated with mine tailings in this area of the Upper Mississippi Valley.

Archaeological Investigations:

Archaeological investigations entailed surface collections in exposed areas, notably few in the Grant River Public Use Area, controlled test excavations utilizing 1x2m or variations thereof at localities of proposed facilities construction, and block excavations, multiples of 2x2m excavation units at localities determined or suspected to harbor cultural deposits.

Specific Impact Mitigation:

Three direct impact localities are indicated in Figure 12, the shower building site, the boat ramp, and the pit toilets. Additional impacts were identified related to the construction of tent pads. At the shower building locality, 6 1x2m test pits were excavated prior to preparation of the site. Preparation consisted of little more than removal of the vegetation cover and then raising the grade by depositing 2-4' of sand fill prior to construction. (A controlled surface collection was conducted following removal of vegetation.) Pit toilet localities were tested by the excavation of a 1x2m unit at each toilet location. Finally, a 1x2m excavation was placed at the site of the proposed boat ramp. All tests excavations were supplemented by remote sensing and bucket auger investigations.

Initially, it was assumed that tent pad construction would be implemented subsequent to significant site preparation. However, tent pad construction consisted simply of removal of the surficial vegetation, excavations of small trenches, 4-6" in depth for placement of railroad ties, and placement of crushed rock on the tent pad sites. Each of the tent pads were inspected during the construction.

Block excavations were implemented in three localities as indicated in Figure 12. The first of these localities was coincident with the area of an unreported site noted in the Charles E. Brown Archaeological Atlas (Brown n.d.), the second was at a locus indicated by remote sensing and soil

Figure 12

(See Packet Map)

coring to contain cultural materials, and the third was coincident with tests by Rock Island District Staff (see Appendix A), adjacent to the knoll like feature near Ritzenthaler's 1945 excavations (Ritzenthaler 1946).

RESULTS OF THE 1984 INVESTIGATIONS:

Remote sensing investigations, coring with bucket augers, test, and block excavations revealed a long occupational history on the Grant River Public Use Area. Cultural materials were found in virtually every locality where subsurface investigations were implemented. Unfortunately, due to erosional and depositional processes during middle and late Holocene times, many of the materials have been mixed, and, as a result, it is not possible to segregate cultural remains by specific component. However, several aspects of past human activity can be defined and interpreted. In addition, the effects of climatic fluctuations on the landscape area revealed from the perspective of these investigations, and subsequent effects on past human response to these changes can be inferred. The results of specific investigations are summarized in the following narrative.

Remote Sensing:

Ground penetrating radar survey conducted at 10m transects across the entire recreation area, and tighter transect survey at two direct impact locations resulted in the identification of 391 sub-surface anomalies. These anomalies were recorded on the site grid and their depths were scaled. Four categories were defined: (1) 0-2' below the surface, (2) 2-5' below the surface, (3) 5-8' below the surface, and (4) those identified at a depth greater than 8.0' below the present surface. Figure 13 presents the distribution of sub-surface anomolies by depth category.

As with all remote sensing data, anomalies identified through the use of ground penetrating radar must be confirmed and interpreted. At the Grant River Public Use Area, radar anomalies were confirmed both by bucket auger and by excavation. Three particularly dense concentrations of cultural materials, buried approximately 50.0cm below the surface were identified through the use of the radar. As well interfaces between coarse and fine sediments, very useful in reconstructing the geomorphic history of the Potosi Terrace, were noted at several locations. In other localities of suspected archaeological deposits, ground penetrating radar was utilized to demonstrate the absence of such remains.

In some instances natural features such as tree roots, the water table, or stratigraphic discontinuities caused the radar anomaly. At other locations, recent cultural features such as metal trash or rubble fill related to development of the recreation area were noted as the source of a given anomaly. Finally, several anomalous readings

Figure 13

(See Packet Map)

were determined to have resulted from unusually dense concentrations of cultural material, primarily lithic debris, or, a cultural feature such as a hearth associated with other cultural materials. Many cultural anomalies were verified and the major clusters are presented in Figure 14.

With regard to the resistivity survey, apparent resistivity values were calculated from the measured voltage and current of the system--which was read directly in ohms off the equipment-- and the spacing between the electrodes. The equation used to caluculate apparent resistivity is:

$$\rho_a = 2\pi A \frac{V}{I}$$

where ρ_a = apparent resistivity (ohm-meters)

A = the electrode spacing (1 meter)

V = potential (volts)

I = current (amperes)

Since the depth influence remained constant from one station to the next, the technique measured lateral changes in resistivity, the data were analyzed by two methods to detect and map anomalous spatial features.

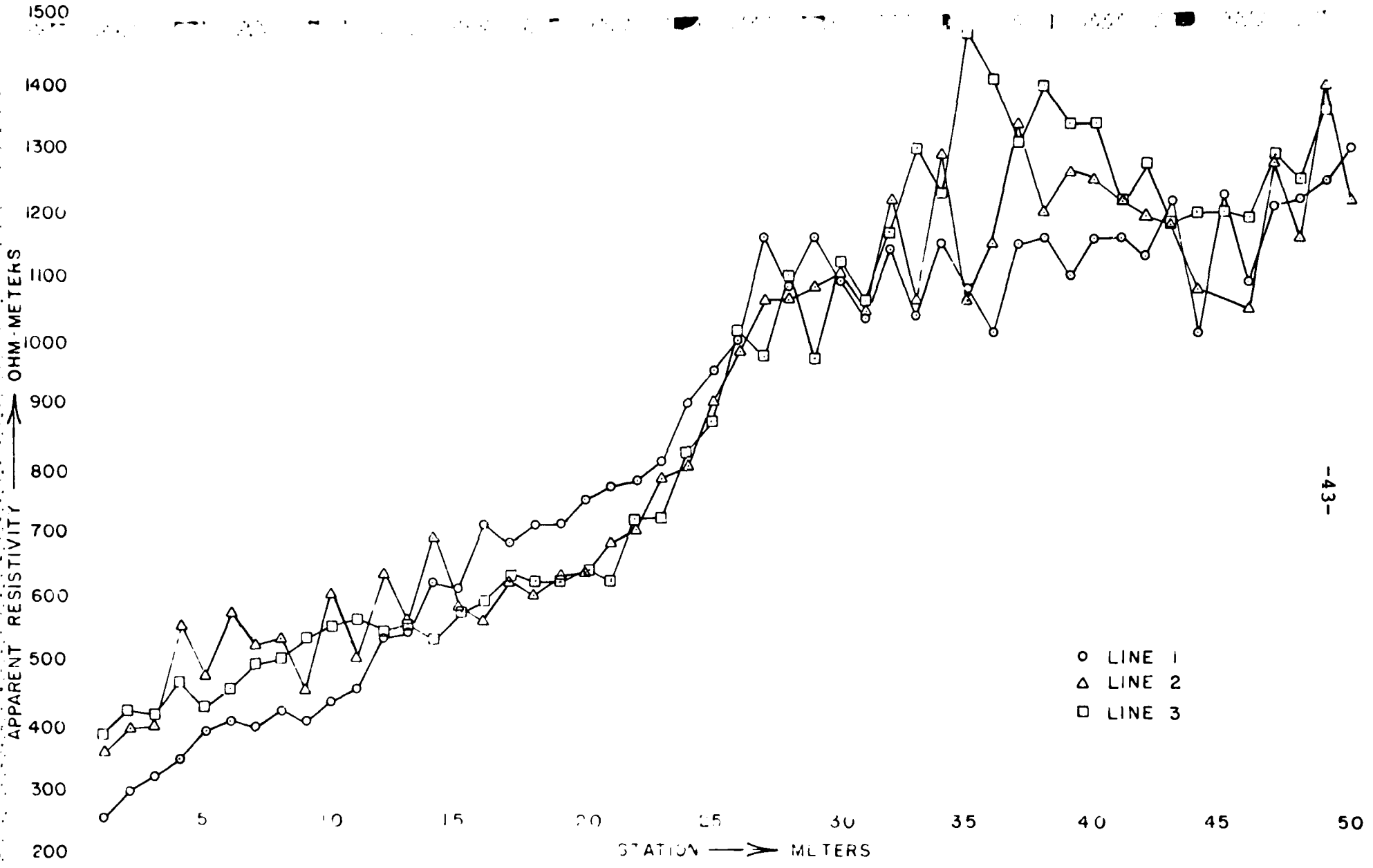
Resistivity values were first plotted on a map and contoured to observe planar changes in resistivity. This contour map is depicted on Figure 11. The second method used to evaluate the traverses was to plot each individual traverse line on a graph. The graph plots apparent resistivity versus station location and depicts the three traverse lines (Figure 15).

Changes along the traverse lines are readily seen in both representations of the resistivity data. The contour map shows a significant variation in resistivity values occuring south of station 24. In the area north of this station, resistivity values slowly increase at a relatively constant rate. A few anomalous areas are detected, such as line 2, Stations 11 and 12. However, in general, the area appears relatively uniform. South of Station 24 the contour lines are more closely spaced and there is much more variation in the values. This is depicted by the numerous depressions and high points seen in the contouring. The same type of phenomena is also seen in the graphical representation of the data. All three traverses are quite similar in appearance. From Station 1 to Station 26 there is a steady increase in resistivity values. These portions of the curves are also relatively smooth, especially between Station 16 and 26. Line 2 has the most variation in the beginning portion of the curve. After Station 26 the values level off although their variance is greater than that in beginning portions of the traverses.

The consistent increase from north to south is confirmed as reflecting an archaeological deposit, buried by approximately 30-50cm of windblown sands. The lateral extent, mapped with ground penetrating radar, resistivity, excavations, and bucket auger transects is depicted in Figure 14.

Figure 14

(See Packet Map)



Donohue

Engineers & Architects

RESISTIVITY PROFILE

OSCEOLA SITE

FIGURE 15

Unit/Block Descriptions/Site Stratigraphy:

Sequential numbers were assigned to each unit as it was excavated. Excavation was conducted in 1.0m quadrants for each unit. Matrix was removed in most instances with masonry trowels except in obvious disturbed areas of fill and plowzone, and was then passed through 1/4" mesh. Mapping and photographic records were recorded for each unit and a level/feature record was compiled for each unit. Unless specifically noted, all excavation was conducted in 10.0cm arbitrary levels.

Unit 1:

Unit 1 was established at E-120/S-194 (all units designated by southwest corner). This 2x2m excavation unit was placed at this location as it was adjacent to Test Unit 29 excavated by Rock Island District Staff (see Appendix A) where cultural materials were recovered to a depth of 143cm. The location was also important as it was near the excavations of Ritzenthaler (1946) and likely represents a remnant of a once prominent knoll. This knoll has been the subject of some discussion and it was not clear if the feature represented a natural topographic phenomenon or a man-made mound. Thus, several immediate questions could be resolved by unit 1 excavations. First, we sought a larger sample than that provided by Test Unit 29 from the Rock Island District investigations and confirmation of the relatively deep context of cultural materials. Second, in so far as possible, we sought to clarify the origins of the knoll-like feature noted by Ritzenthaler (1946).

At first glance, the stratigraphy (see Figure 16) of Unit 1 appears relatively simple and is consistent with that described by Rock Island District Staff. A black organic sand, with minor color variations is found from the surface to a depth of 45-47cm. Below this black sand is situated an oxidized sand horizon which grades rather imperceptibly into a lighter sand at approximately 140cm below the present surface. At this level or slightly below, a series of reddish clay bands can be observed. As noted by Berg (1984), various chemical processes are responsible for flocculating illuviated clays. Given adequate time, illuvial zones eventually segregate into incipient but distinct clay-band horizons in sandy well-drained soils (Berg 1984: 45).

The sandy matrix of the terrace is characterized by an upward fining sequence. Much of the upper organic sand appears to have been redeposited by eolian activities, even though this is partially obscured by historic plowing activities at the site. Additional disturbance, turbation by small mammal dens and runs, is apparent in most every excavation unit, often accompanied by translocation of cultural materials.

Cultural materials were recovered, in no apparent association with stable surfaces, to a depth of 1.50m below

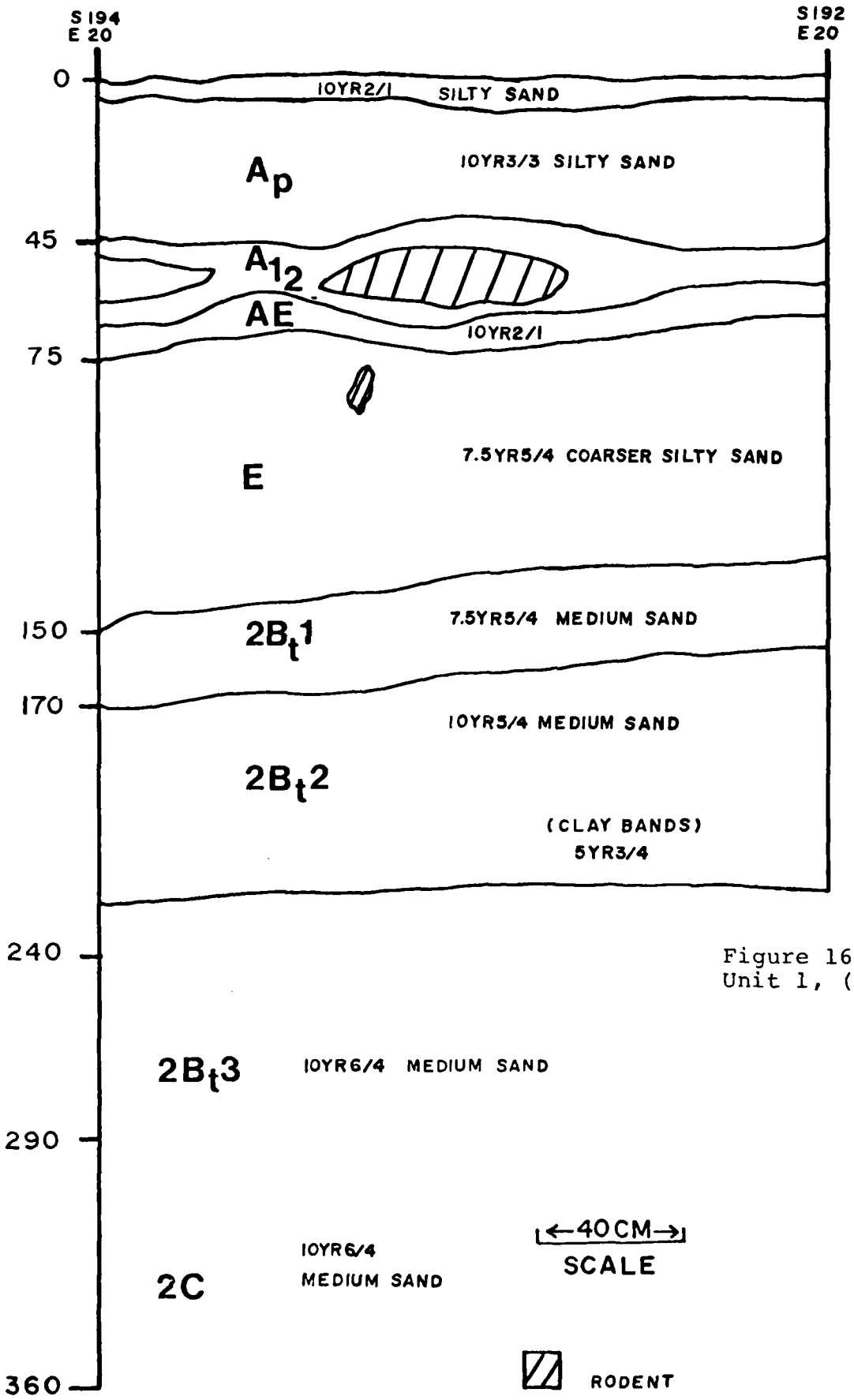


Figure 16: Profile, Unit 1, (47 Gt 24).

the surface. Late Woodland ceramics and projectile points occur as deeply as 1.0m. No features or organic stains, save those identified as rodent activity, were encountered in the excavation of this unit.

Unit 2:

As indicated in Figure 12, Unit 2 is a 2x2 meter excavation placed at grid location S-418/E-380. The unit was excavated to a depth of 80.0cm below the surface and was situated at this locality, near Rock Island District Test Unit 17 (see Appendix A), to evaluate the campsite reported by C.E. Brown (n.d.). Recent historic debris litters the surface here, undoubtedly associated with a cottage that had been removed from the site in recent years.

Stratigraphy at this locality is indicative of a severely deflated surface. Figure 17 presents profiles from this unit indicating a narrow bank of silty sand, perhaps an incipient A horizon formed atop a plow zone. The plow zone has a depth of only 20.0cm and is situated atop a relatively bright orange sand. This oxidized sand grades, again rather imperceptibly, into a coarse tan sand at an approximate depth of 60.0cm.

A very dense concentration of lithic debris, primarily associated with biface production, was encountered in levels 2, 3, and 4. No features were observed and it is apparent that concentrations of debris including cores, bifaces, and much shatter rest on deflated surfaces. Cultural materials were quite sparse below level 5 and those that were encountered were associated with rodent burrows and runs and had been translocated.

Remote sensing at this location indicates a series of tightly clustered sub-surface anomalies of an approximate extent of 40.0 x 50.0m. This locality is interpreted as a lithic processing station. Unfortunately, deflation of the locality prohibits analyses by specific component.

Unit 3:

This 1x2m excavation unit was placed in the locality of the proposed shower building as indicated on Figure 12. As the profiles presented in Figure 18 depict, this was one of the few localities where deposits from flooding activities could be identified. Further, the thin flood deposits, given their relationship to a thin band of clay fill, were likely laid down by the 1965 flood.

Very sparse cultural material was recovered from this unit. However, the vertical distribution is significant. Lithic debris and a few small Late Woodland pottery sherds were recovered from within and immediately below the plow zone (levels 1-4). Level 9 also yielded lithic debris. This distribution suggests, given the flat lying orientation of the flakes in level 9, a deflated surface which was later reburied by wind-blown sands. Following the deposition of

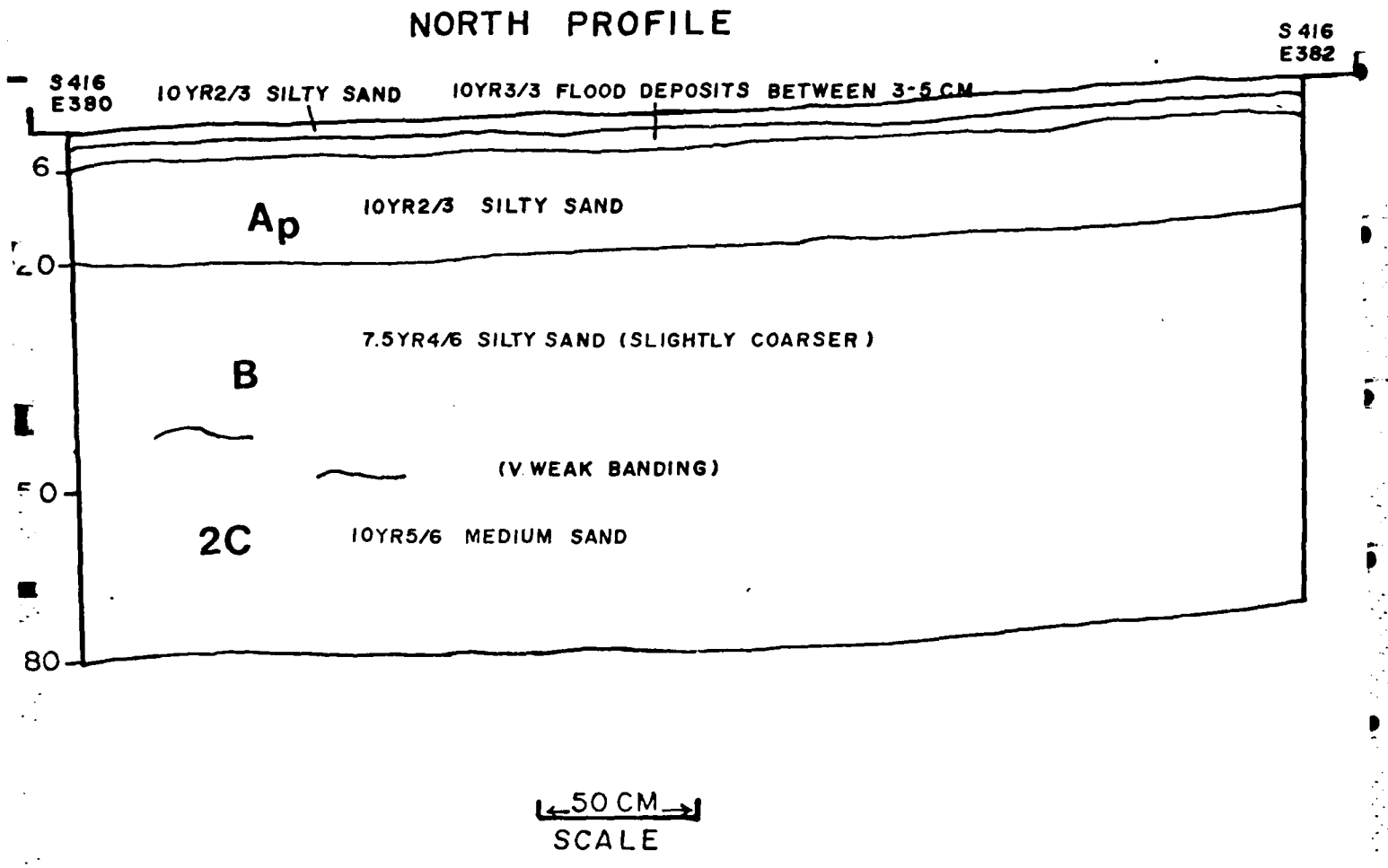


Figure 17: Profile, Unit 2 (47 Gt 24).

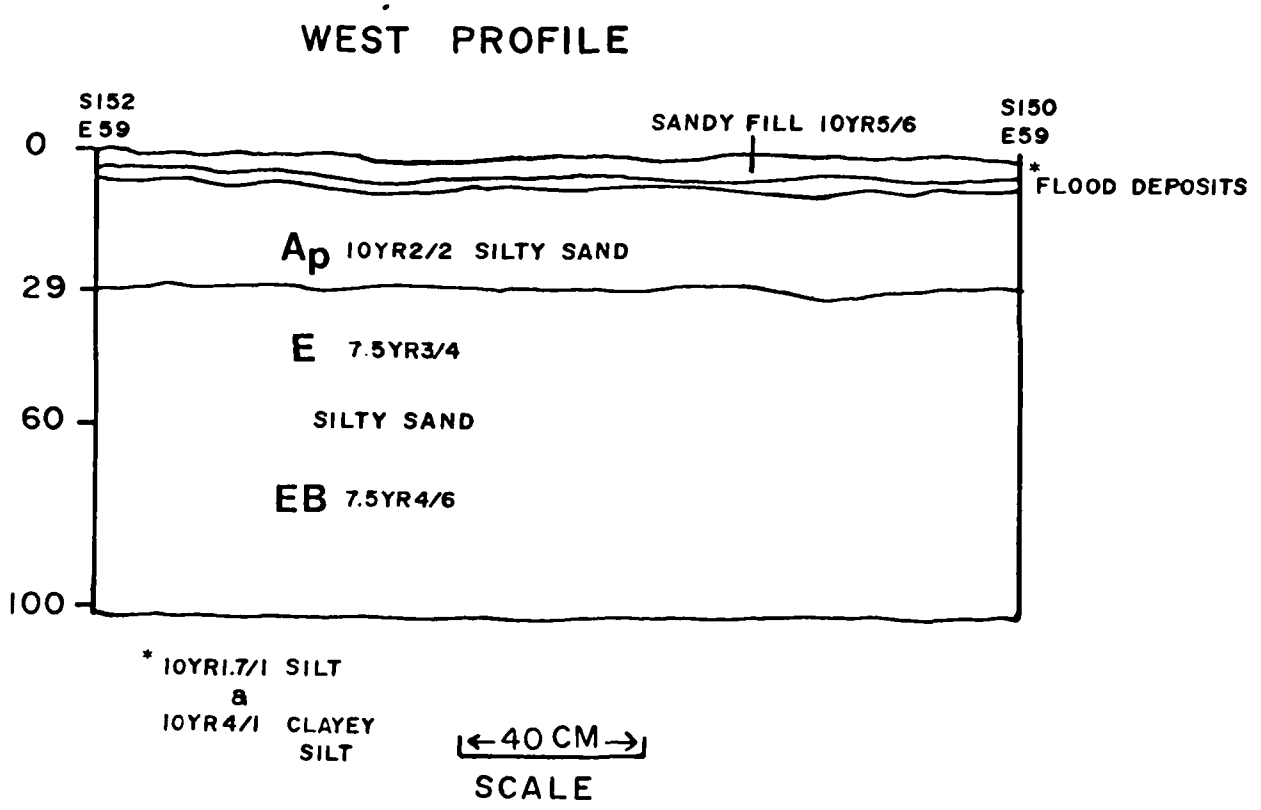


Figure 18: Profile, Unit 3 (47 Gt 24).

some 20-30cm of sediment, the surface was stabilized, and a few Late Woodland artifacts were deposited here.

Unit 4:

Unit 4 is located 25m east of Unit 3 at coordinates S152/E75, again, at the site of the proposed shower building complex (Figure 12). The stratigraphy of unit 4 is almost identical to that recorded for unit 3 (Figure 19). A thin mantle of recent flood deposit is situated atop the plowzone at the surface. No features were noted in unit 4 with the exception of a rodent den. Again, although materials associated with prehistoric cultural activity were very sparse they were encountered in the upper (plow zone) levels, and in level 7. Twenty centimeters of sterile sand segregated artifacts in upper levels and those in level 7.

Unit 5:

A 1x4 meter trench was placed in the shower building locality at S-148/E30. Remote sensing survey had indicated a shallow sub-surface anomaly in this locality (Fig's 12 and 13). As indicated in the profiles (Figure 20), this locality is characterized both by deflation and mechanical stripping. The remnant of the plow zone is ca. 15.0cm in depth and slopes to the north. *Lithic debris and a few* small Late Woodland ceramic sherds were recovered from unit 5.

Unit 6:

This 1x4 meter trench was situated immediately east of unit 5. The radar anomaly was confirmed as an historic (ca. 1960's) garbage dump associated with development of the recreation area. As indicated in the profiles in Figure 21 and the Plan view in Figure 22, the area has been significantly disturbed. Surface materials have been pushed from the west, and the plow zone from unit 5 has been placed as overburden on unit 6. Intensive rodent activity was noted here, and in spite of the retrieval of prehistoric artifacts, historic intrusions, tin cans, glass, and other recent garbage were found in a small dumping episode 70.0cm below the surface. This recent garbage dump and fill is responsible for the radar anomaly.

Unit 7:

Unit 7 is a 2x2m excavation placed adjacent to the present bank, west of Unit 1 on the remnant of the so-called knoll like feature. Its purpose was to determine the extent of modification related to bank stabilization and the prospects of encountering intact cultural and natural strata immediately adjacent to the present bank. The grid location is S-188/E-2 and is depicted in Figure 12. Various 1940's

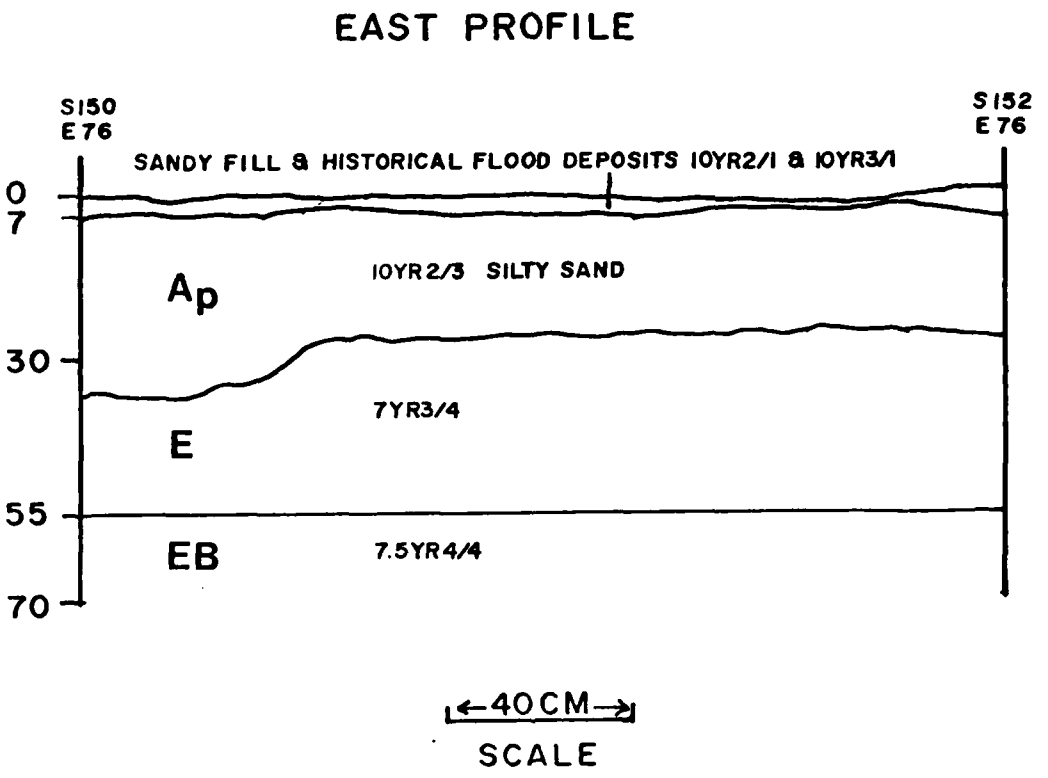


Figure 19: Profile, Unit 4 (47 Gt 24).

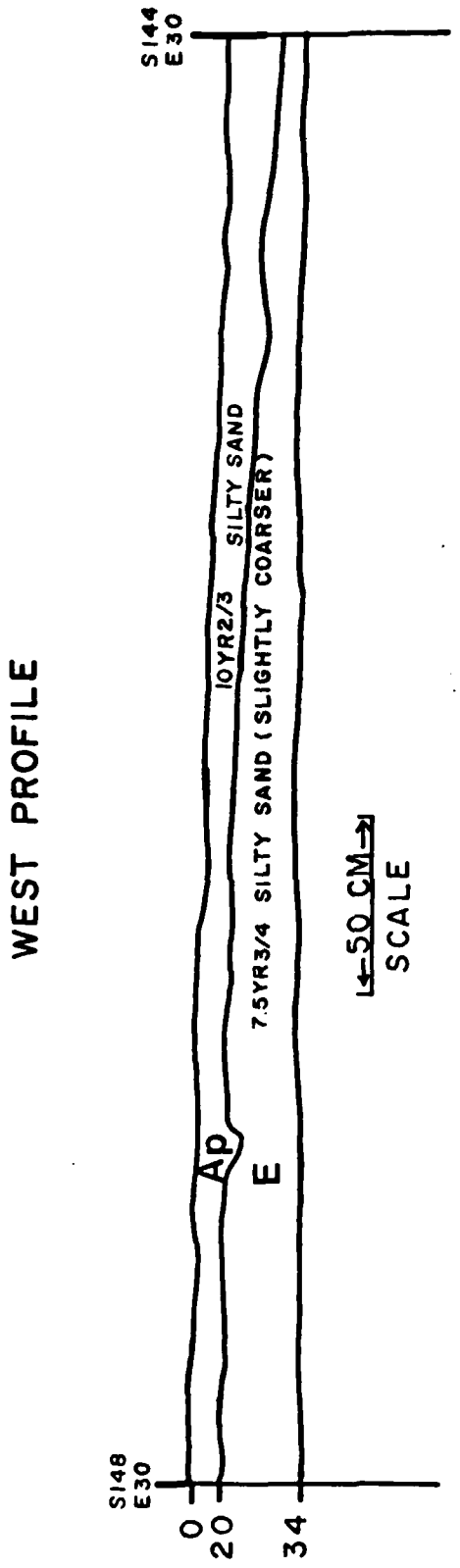


Figure 20: Profile, Unit 5 (47 Gt 24).

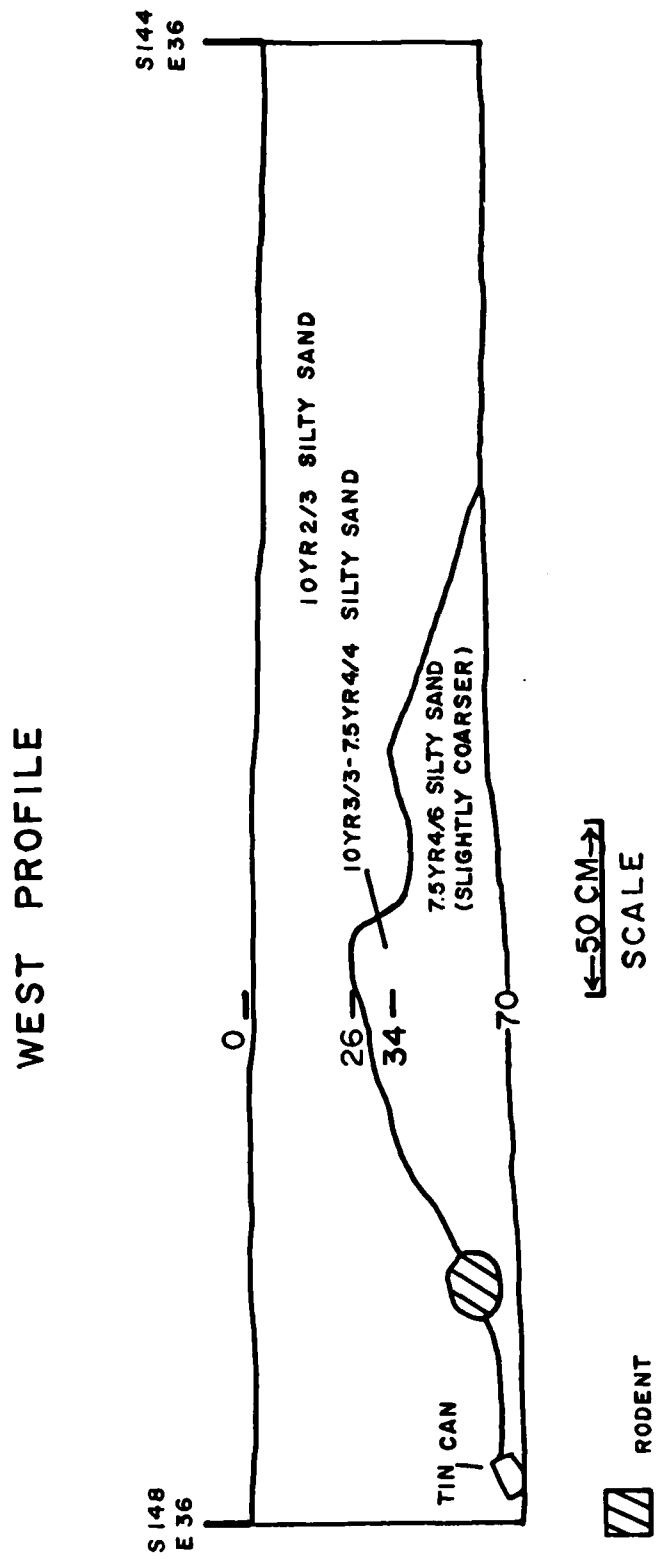


Figure 21: Profile, Unit 6 (47 Gt 24).

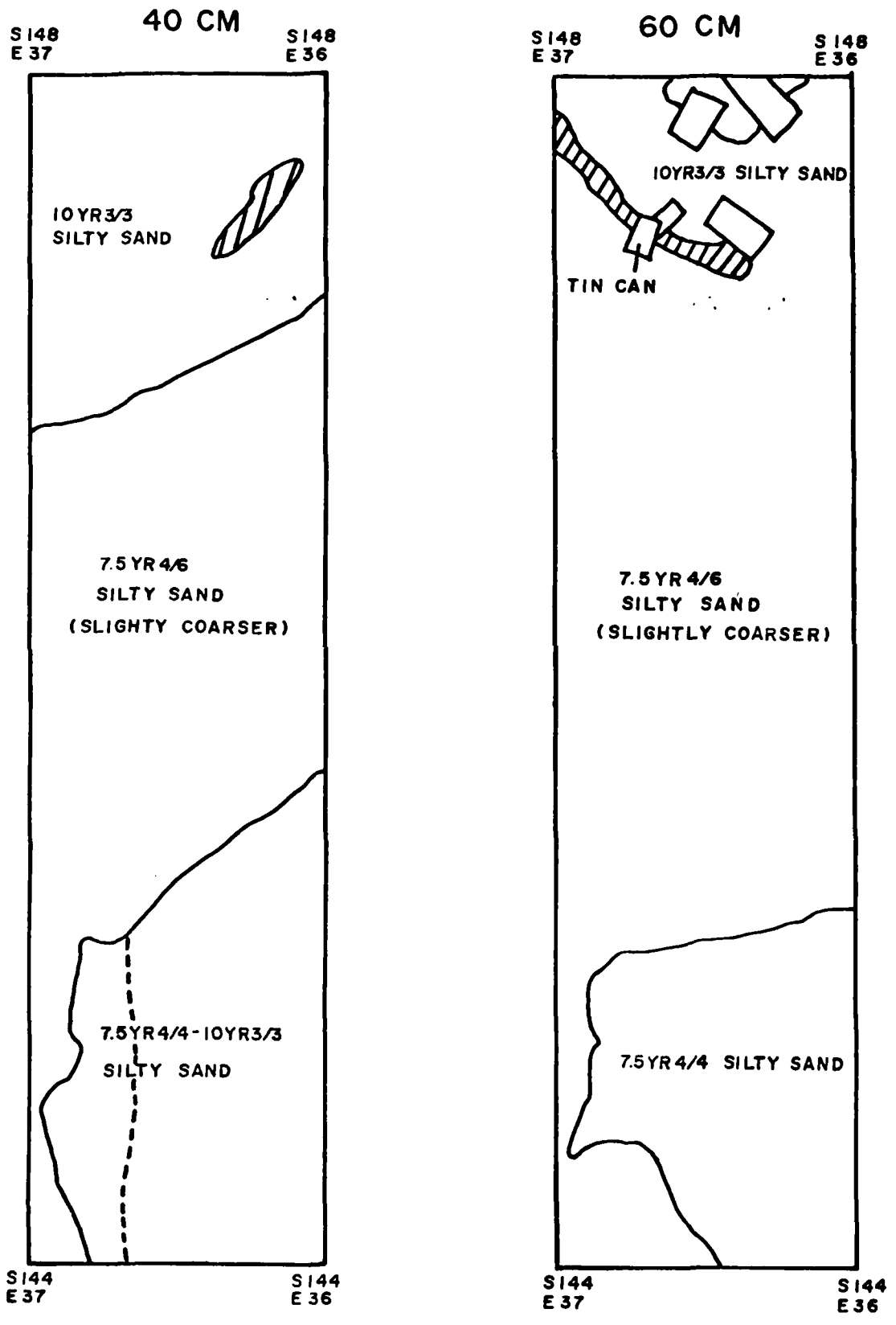


Figure 22: Plan views, Unit 6 (47 Gt 24).

newspaper accounts and those of local informants indicated much irregularity in the topography of the erosional bank of the terrace. As well, photographic records from Ritzenthaler's excavations, made available through the courtesy of the Milwaukee Public Museum, indicate gullying along this bank. It was hoped that this unit would provide additional insights to resolve the discrepancy between the 5.0' of black sand reported by Ritzenthaler (1946) and the 50-60cm indicated in unit 1.

Profiles of this excavation unit (Figure 23) provide information regarding modification of the cut bank prior to stabilization with rip-rap. Dredge spoil had been dumped on the erosional face prior to rip-rap placement. As excavation proceeded, a substantial amount of cultural debris was found both in and below the plow zone. No distinct features were identified. However, at level 5, a broken Late Woodland vessel was encountered on what had once been a surface, perhaps only stable for a short time. At 60-62cm below the surface, a contracting stemmed projectile point was found, a chert drill was recovered at 64.0cm, and a broken side-notched projectile point was encountered at 65-68cm below the surface. These implements were all recovered in the oxidized sands and are in appropriate vertical relationships indicative of Late Woodland, Early Woodland (Prairie Phase), and Late Archaic occupation at 47 Gt 24. In spite of this apparent stratigraphic relationship, no stable surfaces could be identified and it is plausible that deflation and redeposition was inhibiting pedogenesis at this locality from Late Archaic through Late Woodland times.

Units 8 and 10:

Units 8 and 10 are contiguous 2x2m squares placed downslope from unit 2. This block was placed in this locality both for purposes of additional confirmation of the horizontal distribution of cultural materials indicated by ground penetrating radar, and, to evaluate the potential for encountering subsurface features buried by slopewash. As noted, the locality of unit 2 was severely deflated, but remote sensing indicated cultural debris continued to the downslope position.

An intact hearth was encountered immediately at the base of the plowzone, and associated diagnostic artifacts indicate a Late Woodland affiliation for the feature. Unit 10, was an expansion of unit 8. As depicted in Figure 24, the hearth was situated in both units 8 and 10.

Unfortunately, slopewash and eolian sediments have sealed only the Late Woodland component at this locality. Artifacts found below the hearth (level 3-4) were not associated with surfaces indicating stability. The Late Woodland hearth, and associated cultural materials, also rested upon a surface lacking any long-term stability.

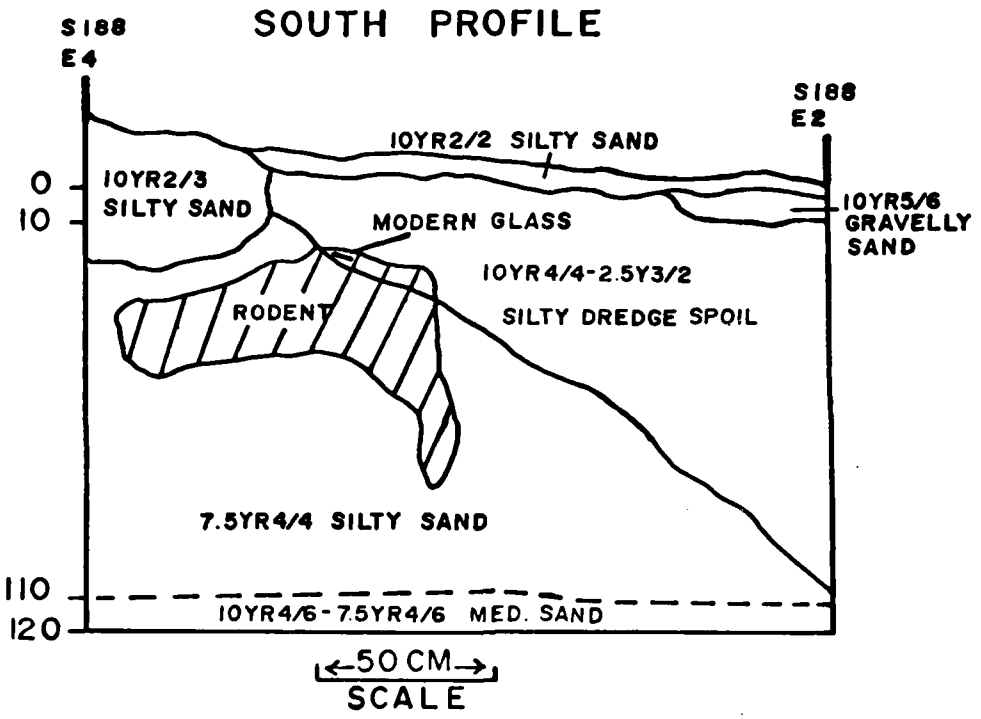


Figure 23: Profile, Unit 7 (47 Gt 24).

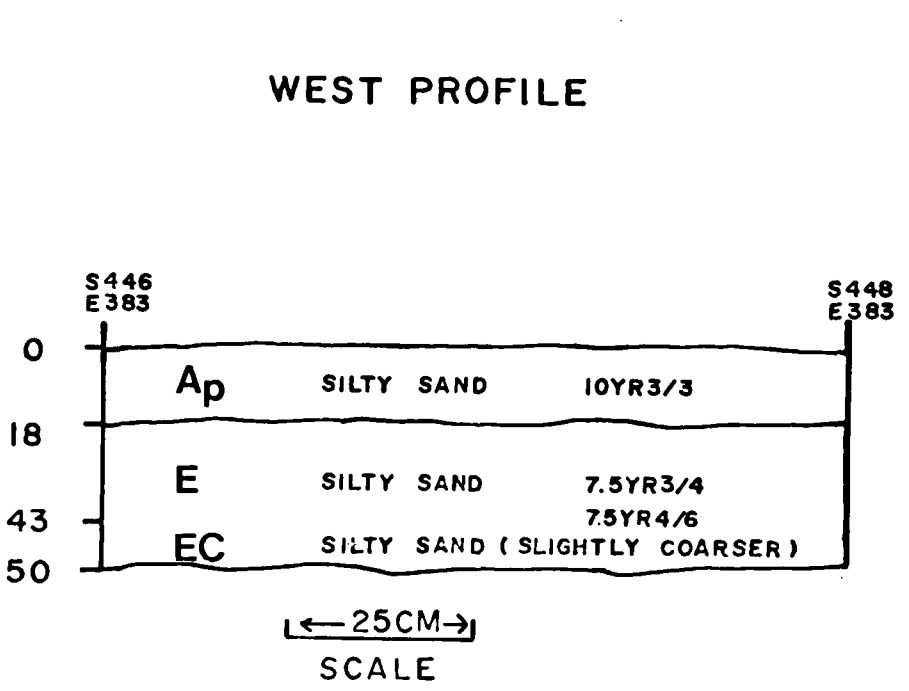


Figure 24: Profiles, Units 8 and 10 (47 Gt 24).

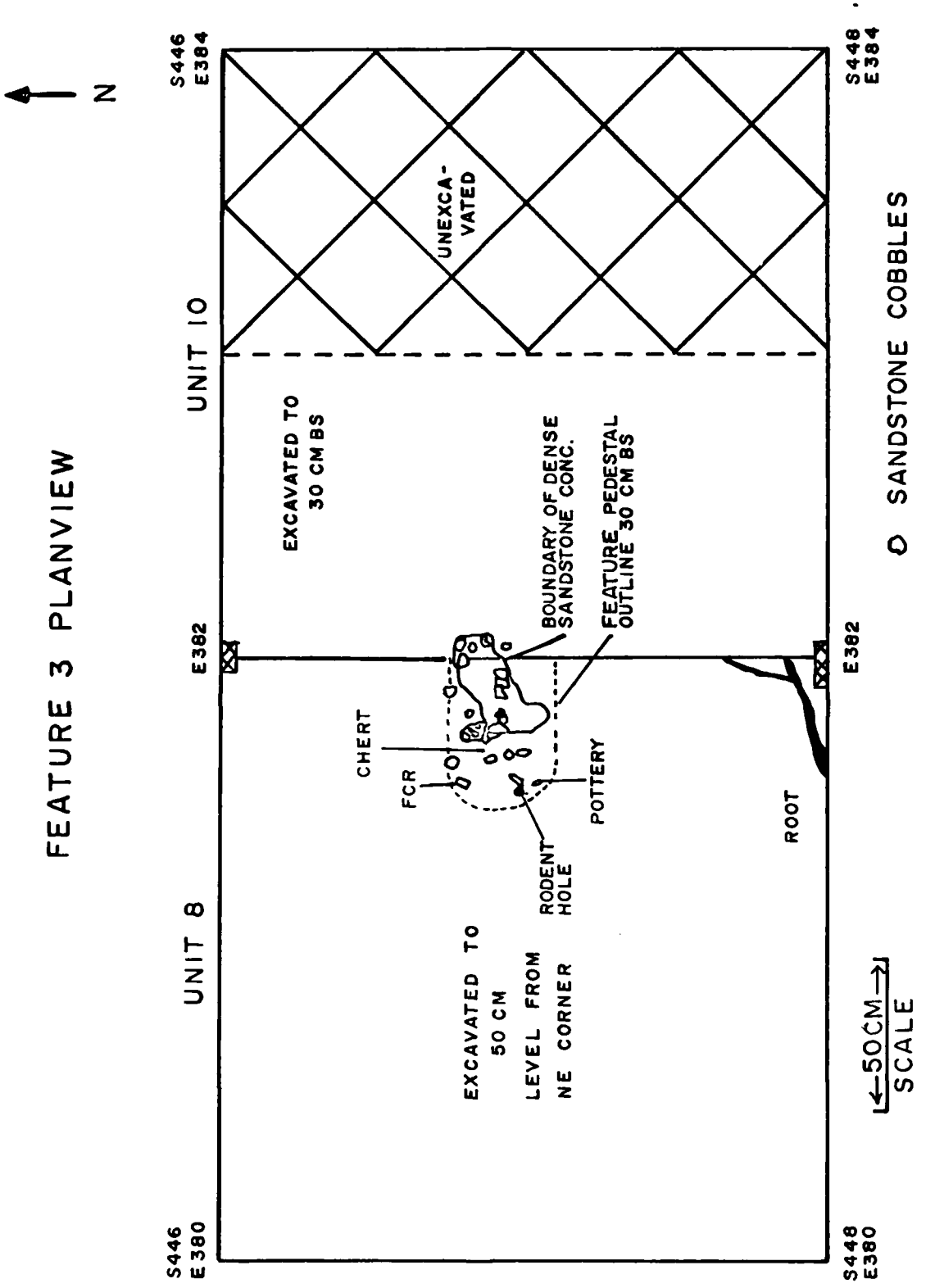


Figure 25: Plan Views, Units 8 and 10 (47 Gt 24).

Units 9, 11-16, 25-26:

This series of 2x2m units established adjacent to unit 1 represent a block situated at coordinates S192-194/E6-22. Two extensions, units 25 and 26 are placed north of units 13 and 14. Figure 12 provides the location of these units.

Excavations were conducted by trowel to a depth of 1.50m and auger holes were drilled in the base of the excavation unit. The purposes of this block were to refine our understanding of site formation processes, and, through the retrieval of a larger sample, to interpret the cultural stratigraphy at the Grant River Public Use Area. In part, the locality was selected as the intra-site geology indicated greatest stability on the terrace. In addition, previous investigations conducted by Ritzenthaler (1946), Rock Island District (see Appendix A), and various local informants noted cultural materials at significant depths, often more than 1.2m below the surface, a phenomenon confirmed by unit 1.

Figure 26 presents the profile of this block and notes the substantial turbation by rodents and that associated with the construction of a 20th century fishing shack. Three intact woodchuck skeletons (Marmota monax) were found fully articulated in dens. No discrete discernable stratigraphy is apparent, however, two genetically similar, but texturally dissimilar, soil units can be defined. The upper unit is of Holocene age and is interpreted as largely the result of eolian processes. The lower unit is relatively coarse and is considered of late Woodfordian age, a product of final cut and fill episodes of the Mississippi River.

Cultural materials were encountered in virtually all levels of the excavation block, though many (all of those in the lower soil unit) were translocated by rodents and other turbation processes. Distribution of artifacts provides some keys to site culture history, but no long-term stable surfaces can be identified from Late Archaic through Late Woodland times. Reworking and/or destabilization of Holocene surfaces is likely a function of combined climatic events and human agencies at this locality. Review of Figure 26 depicts the difficulty of defining time-depth relationships, or, the isolation of specific components. The potential for interpreting the effects of climate and man on the terrace landscape, however, is significant. This orientation is more comprehensively addressed from the perspective of the combined geomorphic/archaeological investigations in a subsequent section of this report.

Units 17, 18, and 28:

Three excavation units were placed at this locality near the boat ramp where remote sensing and auger investigations identified a cultural deposit ca. 2.0 feet beneath the present surface. Depicted on Figure 12, Unit 17 is situ-

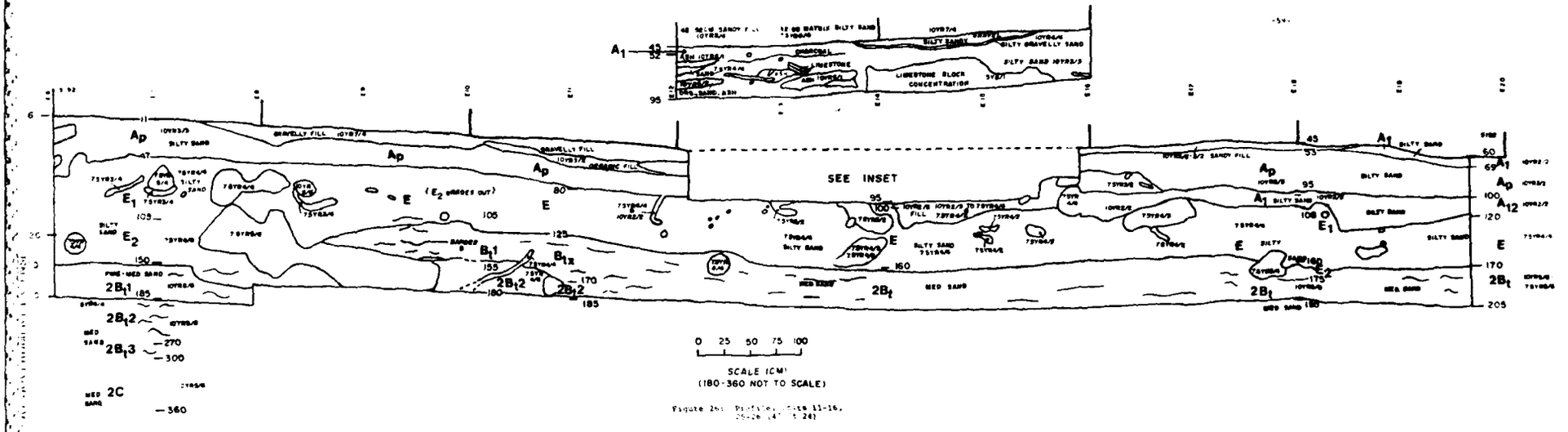


Figure 24: Profiles, Sites 11-16, 25-28 (4 of 24)

ated at S-278/E120, Unit 18 is located at S-280/E120, and unit 28 is located at S-292/E140.

Surfaces were identified by artifact concentrations at 50.0-60.0cm below the surface and undoubtedly are responsible for the ground penetrating radar anomaly at this location. Late Woodland ceramics and lithics were encountered from levels 2-5. Below level 5, cultural material steadily diminishes to the banded B horizon (1.0m) where artifacts are interpreted as translocated by rodent activity. Unit 28 was significantly more productive and while Woodland materials were encountered in levels 1-5, Late Archaic Diagnostic implements were recovered from levels 6-9. Figure 27 is a profile of Unit 28 which is identical to those of Units 17 and 18.

Units 19 and 20:

Units 19 and 20 were excavated in an old tree line, south of the partially filled drainage which bisects the Recreation Area (Figure 12). Mature Oaks and Locust trees indicated that this area was the edge of an old cultivated field and had not been plowed for many years. In addition, tightly clustered near-surface anomalies indicated the potential presence of sub-surface archaeological deposits.

The anomaly was confirmed as an archaeological deposit as dense concentrations of cultural materials were noted on transitory surfaces in both units 19 and 20. Level 7 of unit 20, for example, yielded 2 stone tools, 159 pieces of lithic debitage, and 7 ceramic sherds. Again, while cultural materials were encountered both above and below the dense concentration of artifacts, no surfaces were identified that were stable long enough for an A horizon to develop. Alternatively if surfaces were stable for a sufficient duration of A horizon development, such evidence was removed by eolian activities. Figure 28 presents profiles of units 19 and 20.

Unit 21:

Located at grid S-400/E320, this 1x2m unit was excavated immediately adjacent to the present shoreline approximately 30 feet from a known concentration of Late Woodland ceramics collected from the shoreline. Depicted in Figure 29, the profile indicates a plowzone over slightly gleyed and oxidized sand. Cultural materials were recovered to a depth of 60.0cm below the surface. Notably, at level 6, 350 water rolled pebbles were noted, indicating instability of a former surface at this depth. Water seepage forced abandonment of this excavation unit without resolution of the suspected Late Woodland concentration.

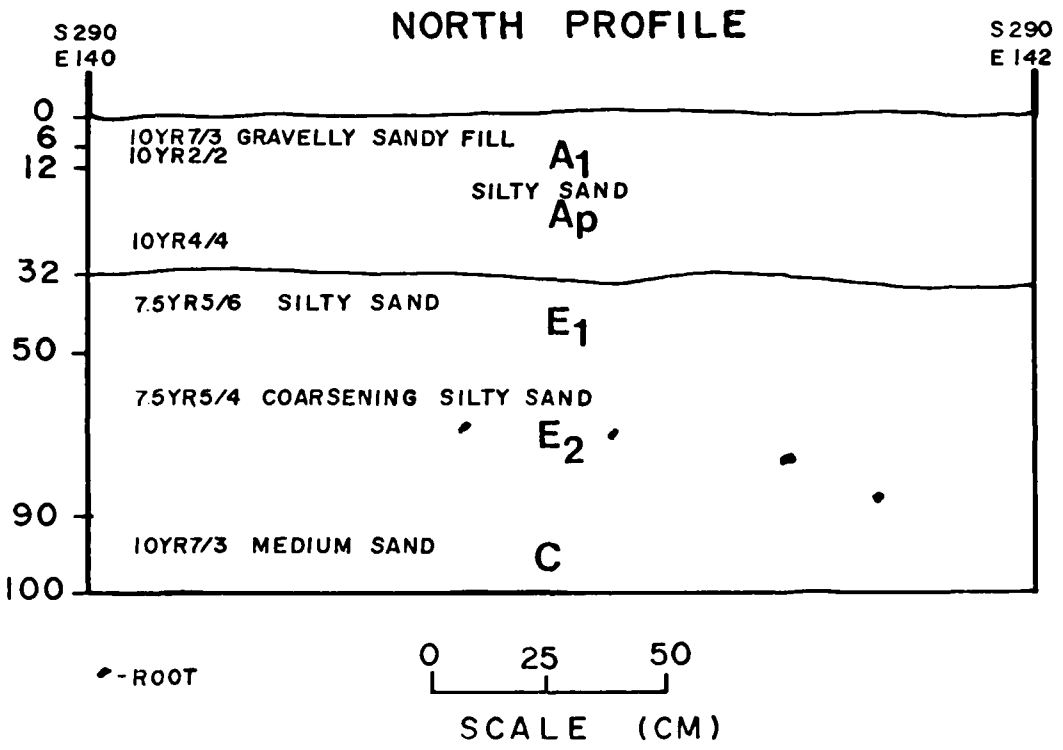


Figure 27: Profile, Unit 28 (47 Gt 24).

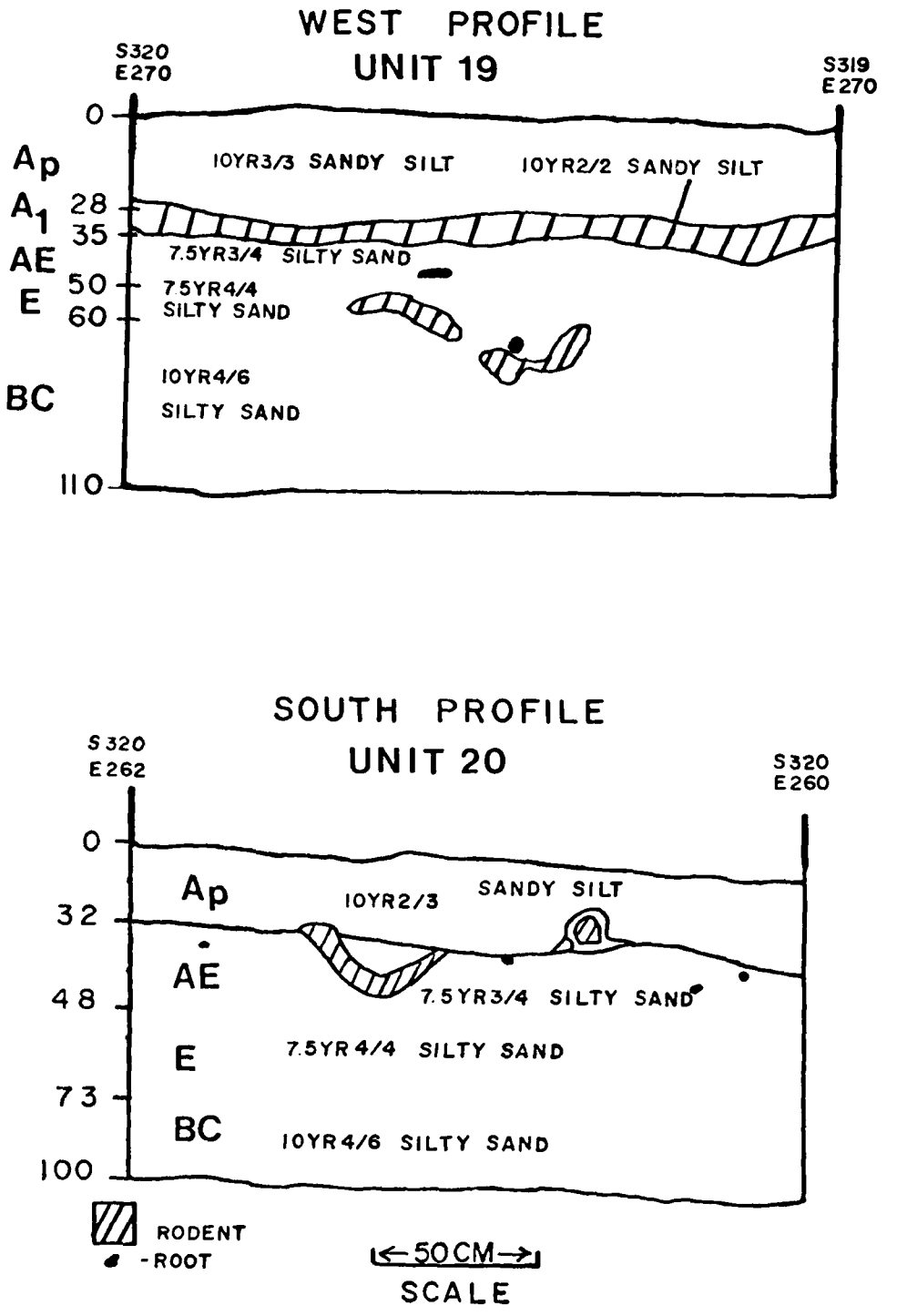


Figure 28: Profiles, Units 19 and 20, (47 Gt 24).

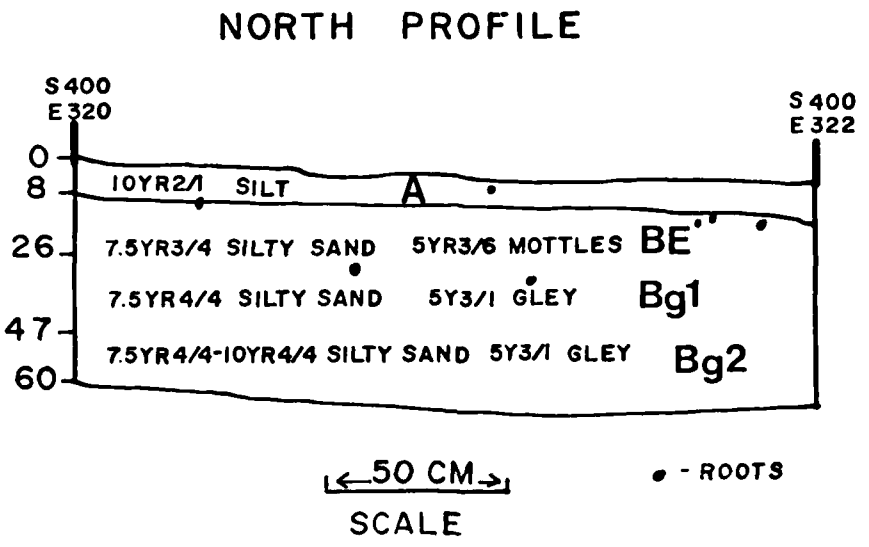


Figure 29: Profile, Unit 21, (47 Gt 24).

Unit 22:

This excavation unit was situated in relation to proposed direct impact from construction of the new boat landing. Unit 22 is located at S-60/W-14-16, where previous disturbance has occurred from cut and fill activities and from shoreline protection. Considerable mixing of recent fill and rubble was noted in the upper three levels of this unit. Sparsely distributed lithic debitage was recovered to a depth of 70.0cm below the surface. Figure 30 presents the profile of unit 22.

Unit 23 and 24:

These 1x2m excavations were placed at the localities of proposed pit toilets at grid locations S-380/E-369 and S-372/E-369. Stratigraphically these units compare quite favorably with Unit 2 and deflation has persisted into recent times removing some of the historic plow zone. In this locality, the lower (late Woodfordian) soil unit is quite near the surface situated at a depth of 50.0cm (see Figure 31).

Cultural materials were recovered in both units, although the frequencies were not significantly high, and this is consistent with the absence of radar anomalies at this locality. A stemmed projectile point and a flake drill were found in level 5 of unit 23. Four Late Woodland ceramic sherds were found in level 2 of unit 24. High frequencies of water-rolled pebbles at levels 6-7 in these units is consistent with the geomorphic interpretation of the late Woodfordian-Holocene interface near the surface at this locality of the Grant River Public Use Area.

Surface Contexts:

Cultural materials were recovered from 5 surficial contexts: (1) controlled surface collections at the shower building site; (2) surface collection of the ditch associated with construction of the new well; (3) tent pads; (4) shoreline localities; and (5) a few exposed areas adjacent to roads.

Minor amounts of lithic debitage were recovered from surface collection of the shower building site and the well drainage trench. None of the lithic items are diagnostic, and all were from contexts previousl· disturbed by plowing.

Shoreline localities were much more productive, particularly when materials from local collectors are considered. Figure 14 provides localities of surface contexts and incorporates information provided by Mr. Richard Adetat, Mr. Joseph Doser, and the Kaltenbach family.

Site-Specific Interpretations-Geomorphology and Archaeology:

The following interpretations and conclusions are

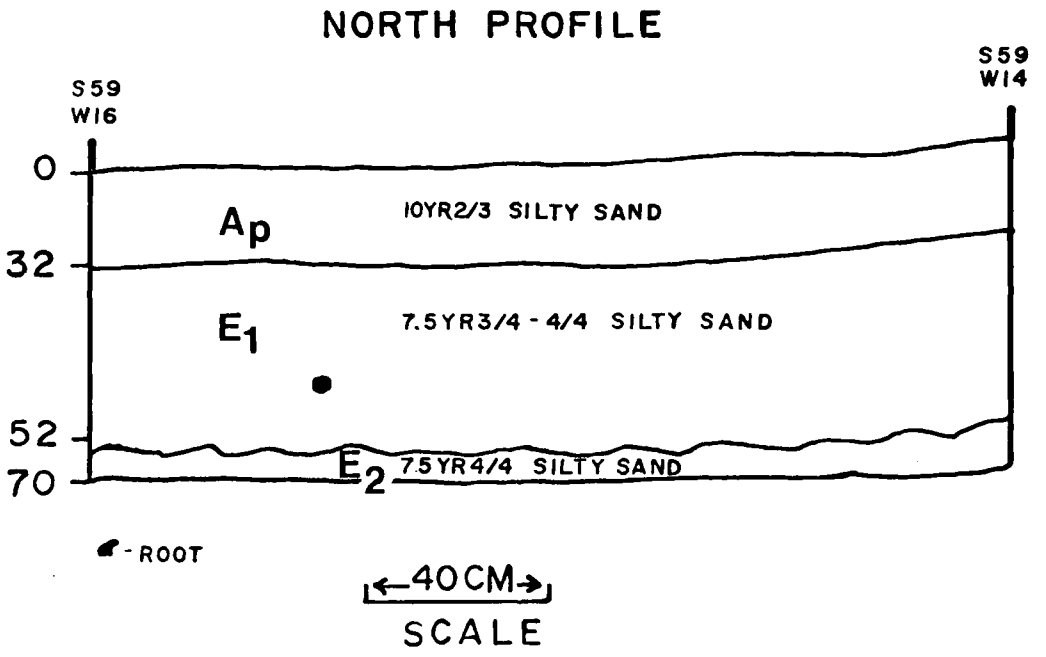


Figure 30 : Profile, Unit 22, (47 Gt 24).

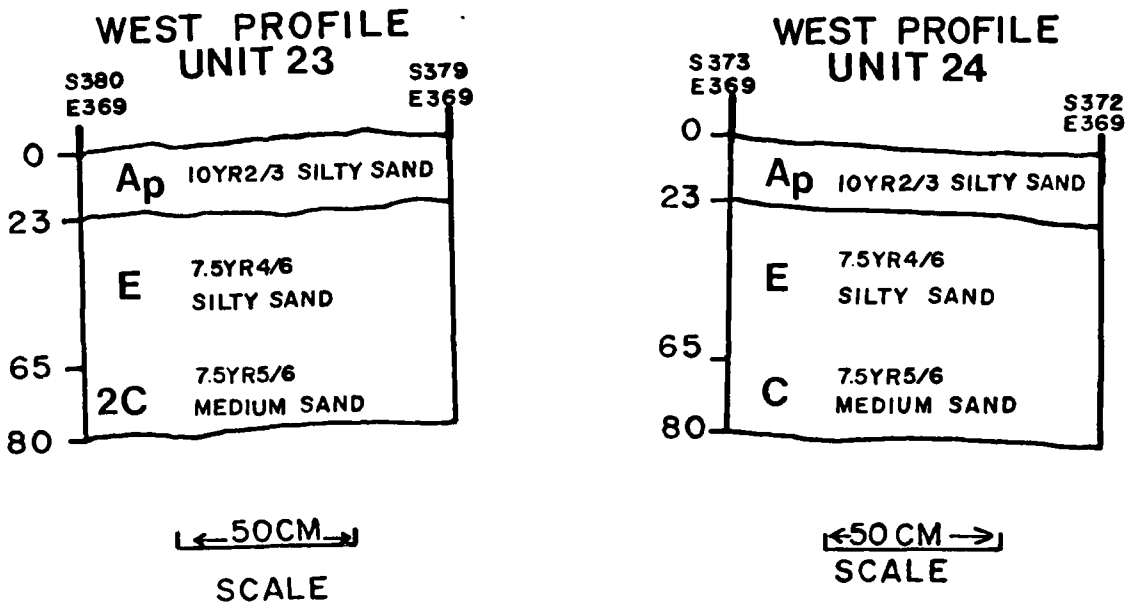


Figure 31 : Profiles, Units 23 and 24 (47 Gt 24).

derived from the Grant River Public Use Area Investigations. Owing to the expansive nature of work at the site, geomorphic and archaeological localities have been identified to provide a comparative framework to evaluate the results of this research. First, the geological/geomorphic localities are addressed. Subsequent to this discussion, archaeological features, contexts, and interpretations are provided.

Holocene Geomorphic and Pedogenic Processes on the Potosi Terrace:

The following statements reflect a number of preliminary interpretations derived from field investigations performed at the Grant River Public Use Area located on the Potosi terrace.

1. The terrace is composed of sediments consisting of 2 genetically similar but texturally different units. Investigations of these units penetrated to just below the present water table associated with the elevation of Pool 11.

2. The surficial unit composed of finer grained material, is most likely of eolian origin. These sediments were deposited during the Holocene perhaps from several different events. The surficial deposit has been destabilized probably several times throughout the Holocene, although some areas appear to have been more stable than others. Reworking or destabilization of the surficial unit has been induced climatically through drought; perhaps through cultural habitation; and induced through mixing of the soil pedon from biopedoturbative processes.

3. The thickness of the surficial deposit varies from about 150cm to about 50cm which suggests episodic erosion (deflation) and deposition.

4. Beneath the surficial deposit is the lower unit composed of well sorted medium sand and occasional gravelly sand. This unit is interpreted as late Woodfordian/early Holocene alluvial deposits in association with the final cut and fill episodes of the Mississippi River.

5. Certain areas of the terrace have a gravel lag observed at or just beneath the contact with the upper unit. This lag is discontinuous across the terrace surface, and could result from; a) catastrophic late Woodfordian high magnitude discharges; b) winnowing of finer grained sand leaving the coarser gravel as a lag deposit during the late Woodfordian; c) Holocene reworking and deflation episodes lowering the gravels that once existed higher up in the profile. The evidence as to the genesis of this lag is unclear. All three processes could account for the lag deposit.

6. In addition to a discontinuous gravel lag, a discontinuous banded B horizon is observed across the terrace. This

banded textural B horizon appears in close proximity to the textural discontinuity between the upper and lower units. The genesis of this soil horizon appears pedogenic, although where thickened clay enriched bands occur in the medium sand or gravelly sand matrix, the origin may be fluvial and associated with slack-water deposition during the late Woodfordian/early Holocene.

7. At least 3 and possibly 4 major soil orders are represented on the Potosi terrace, which suggest that surfaces of different ages exist on the terrace, and reflect relative degrees of pedogenic processes.

8. Soil classification by the Grant County Soil Survey inadequately describes the soils found on the terrace, which is certainly considered to be a problem of scale.

For discussion purposes, field investigations from 4 representative areas within the Grant River Public Use Area will be used to substantiate the preliminary interpretations (see Figure 14). the area located on the west end of the park includes the excavated trench with grid coordinates south 192m to south 194m and east 6m to east 22m This portion of the terrace will be referred to as locality I. The next portion of the terrace to the east of the trench includes the studies from excavation units 3 and 4 and from a transect (south 180m and east 130m to 150m). This section of the site is designated locality II. To the north, a number of cores were taken along a transect with grid coordinates south 80m and east 35m to 55m. Bucket auger holes 54B and 55B are along this transect and represent the locality III. The "south" area is represented by excavation unit 2 located on the southern fringe of the Grant River Park and is cited as locality IV.

The upper unit of the terrace consists of a coarse silty fine sand (refered to as a silty sand in this text), and is clearly observed in localities I, II, and IV. The upper unit in locality III is slightly different and is composed of better sorted material. Texturally it is considered to be a coarse silty very fine sand unit. This unit in addition to being better sorted is overall slightly finer textured. Mineralogically the upper unit at all 4 areas is composed of primarily rounded quartz and angular chert grains with minor quantities of glacial erratics. No calcareous material naturally exists in the surficial unit. It appears to be thoroughly leached of limestone and dolomite. The only exceptions occur where construction of the park led to the deposition of calcareous gravel on the surface and where a thin veneer of recent flood deposits (observed in locus II) cap the surface.

The lower unit is composed primarily of well rounded medium quartz sand. Based on field observations the mineralogical component of both upper and lower unit are quite similar. Where gravels and clays were not found in

the lower unit the sands were extremely well sorted. It is believed that the sediments of the upper and lower units were derived from the same source, the Mississippi River.

The surficial unit appears to be an eolian deposit. Although detailed particle size analysis has not yet been performed, the finer texture seems to indicate eolian deposition. Another indication of eolian activity is seen in locus III where the surficial unit shows a pronounced textural difference from the lower unit, and the contact between the units is abrupt. No evidence of any eolian sedimentological structure was observed at the Potosi Terrace which could be explained by surficial reworking from drought induced surface instability and/or cultural activity. Structure could also have been destroyed from biotic activity.

Another line of evidence illustrating that eolian activity has been active is observed in the Locus IV, where very high frequencies of cultural material are concentrated within a small vertical interval. In addition, the surficial unit is eroded to within 50cm of the underlying medium sand unit. In contrast, the lower unit observed at Loci I and III is found at a depth well below 1 meter.

Beneath the surficial silty sand unit is the medium sand unit thought to be of fluvial origin. This unit in some areas contains well rounded pebbles and gravels of glaciofluvial origin. In addition to the evidence presented from other literary sources, the Army Corps of Engineers provided additional information. A new well was installed at the site during July, 1984, with the depth of the new well hole of approximately 100 feet. Inspection of the sediments brought up during the drilling process showed no apparent textural change between the drill hole sediments and the lower medium sand to gravelly medium sand unit. Since no textural change was observed between these deposits they probably represent the same glacial outwash sediments deposited during the late Wisconsinan/early Holocene age.

Inspection of Locus III shows a pronounced gravel lag occurring at about 170cm beneath the surface. A few pebbles are observed in the coarse silty very fine sand unit above the lag. The granules and pebbles begin to occur about 130cm but concentrate into a coarser gravel lag from 170cm to 185cm. Clay appears in the lag concentration in addition to the medium sands that characterize the lower unit. Beneath 185cm the siltier upper unit is gone and the pebbly gravelly fraction drops off almost entirely. The clay fraction remains with the medium sand but is reduced to a very minor constituent, occurring throughout the matrix but not in bands. In Locus II, along the south 180m transect, bucket auger hole investigations retreived gravel from a medium sand matrix. The gravel was not as concentrated into a well defined lag as was observed in Locus III of the site. In addition, the gravel was found below the stratigraphic boundary between the silty sand and the medium sand, unlike

the north area which showed the gravel lag at the stratigraphic boundary.

The gravel occurring within the medium sand matrix as indicated at Locus II is probably associated with the late Woodfordian/early Holocene fluvial episodes. In contrast, at Locus III the pebbles that begin to occur at 130cm in the well sorted coarse silty fine sand without the presence of any medium sand is not clearly understood. The mechanism concentrating the gravel lag at 170cm would suggest eolian reworking with subsequent deposition, although further study of this problem is suggested.

In addition to a discontinuous gravel lag, a discontinuous banded B horizon is observed across the terrace. This horizon is located near the textural discontinuity between the upper and lower units. Other studies in similar sandy material (Berg 1984, Gile 1979, Dijkerman, Cline and Olson 1967) suggest that these wavy textural bands are pedogenic in nature and result from illuviation. However, banding can also occur from sedimentation processes unrelated to pedogenesis (Dijkerman, Cline and Olson 1967). The banding observed on the Potosi terrace appears to reflect both processes.

The banding that occurs in the Locus I excavation profile is a result of pedogenesis because it appears in wavy, irregular, and discontinuous bands. With increasing depth the bands become thicker and the vertical distance between the bands decreases. Eventually the bands grade out well into the medium sand matrix. Bucket auger holes taken from the base of the west and east ends of the Locus I excavation unit document the occurrance of the textural bands. The bucket auger holes were able to extend the vertical profile of the trench down to 360cm. Although the bands are thought to be pedogenic where they appear closest to the surface, the banding might be alluvial or a combination of both processes in the lower medium sand matrix. If the lower unit banding occurs as a result of slack-water deposition, stratigraphic correlation to other related surfaces along the Mississippi may provide a more accurate determination of the age of the lower unit. Further research is needed in order to determine the nature of the banding in the lower medium sand unit.

A minimum of 3 and possibly 4 soil orders are represented on the Potosi terrace. The U.S.D.A. Soil Survey for Grant County (Robinson and Klingelhoets 1961) does not have a scale small enough to differentiate between the soils on the terrace. The Survey indicates one soil for the site where in fact several soils within each soil order could be described.

The differences between these soils aid understanding of the genesis of the terrace landform. Entisols, alfisols, mollisols, and possibly inceptisols represent the soil orders observed on the terrace (Soil Survey Staff 1975). The Locus I excavation which represents the deepest profile exposures show soils from 2 orders. The west end of the

trench reveals a soil which is described as a Mollic Hapludalf. At the east end of the trench the A horizon is thick enough to satisfy the requirements necessary for a mollic epipedon. Therefore the east end of the trench exhibits a mollisol, a Typic Argiudoll. Locus IV of the park shows a different soil order, resulting from the relatively high degree of eolian scour. The soils here show relatively little horizonation and are considered to be Alfic Udipsamments. Both Loci II and III show soil horizon development but not to the degree of development observed in the trench. These soils are not as easily determined and may require further analysis including laboratory methodology, but they are likely Entic Hapudalfs. These soils may not meet the argillic requirement necessary for alfisols consequently a cambic subsurface horizon would indicate an inceptisol.

The soils of the Potosi terrace from their relative stage of development and morphology provide insight into preceeding Holocene environments. Unfortunately, no paleosols were observed in any of the profiles on the terrace. However, older surfaces are thought to have once existed. The processes of eolian scour followed by deposition, and biopedoturbation have erased or reworked much of the evidence.

The Locus I excavation appears to represent the oldest stable surface on the terrace, which is based on soil profile development and morphology. For example, the surface or A horizon was thickest and most developed along the excavation, which indicates that this area has likely escaped more recent episodes of deflation. During episodes of eolian scour to the east of the excavation, material may have blown up onto this surface from the Mississippi floodplain below. However, this surface has remained stable for a long enough duration to erase any sedimentalogical evidence of eolian deposition. A horizons develop rapidly (within 100 years) in humid and subhumid environments (Hallberg et al, 1978; Schafer et al, 1979). After several centuries A horizons reach a steady state condition between additions of organic material accumulating on the surface and losses of eluvial humus down through the profile (Bockheim 1980, Buol, Hole, and McCracken 1980: 13). Parsons, Scholtes, and Riecken (1962) suggest a steady state in A horizon development on 1000 year old Indian mounds in northeastern Iowa.

Beneath the well developed A horizon is a leached, eluvial (E) horizon. Biotic activity has played an active role mixing material (Hole 1981) from this horizon with material from adjacent horizons. The E horizon in places shows a brittleness and hard dry consistency indicative of a fragipan. This feature occurs infrequently and randomly along the west half of the excavation, but its existence suggests a relative age associated with longer term stability. the genesis of fragipans are uncertain but they are in association with eluvial/illuvial horizons and indicate advanced weathering (Ruhe 1983).

The banding which characterizes the textural B horizon, also indicates relative long term stability. Berg (1984) found the in sandy eolian sediments banded B horizons begin to appear between 2300 and 3500 years, while E horizons will expand 120cm during that same length of time.

The soils of the other three localities indicate eolian reworking. Loci II and IV show profiles that have been eroded without significant redeposition. These soils have considerably thinner A and E horizons compared to Locus I and either weakly or undeveloped B horizons. Locus III provides evidence of relatively recent deflation with subsequent deposition. The surface coarse silty fine sand unit shows only A horizon development with little difference through the profile until clay accumulates at the textural contact with the gravelly medium sand. Whether the clay represents illuviation, fluvial deposition, or both is unclear at this time. But the relative lack of horizonation observed above the textural discontinuity would indicate that the surficial deposit represents a relatively recent eolian episode.

The soils of the Potosi terrace illustrate a complicated Holocene history where periods of relative stability probably occurring during the early Holocene were interrupted, perhaps episodically, by middle and late Holocene events. The soils developed on the terrace reflect the relative importance of geomorphic and pedogenic processes affecting the landscape.

Archaeological Localities:

Given the nature of the stratigraphy at the Grant River Public Use Area and the site formation processes evidenced by geomorphic investigations, it is appropriate to interpret the archaeological data, in so far as possible, with identified landscape features. However, it is necessary, owing to the variations is prehistoric activity at the site to subdivide the recreation area into 7 localities. At the same time, these are correlated with the 4 geomorphic localities previously identified and interpreted (Figure 14).

Area A:

Area A falls within geomorphic locus IV (see Figure 14) at the southern margin of the recreation area. Excavation units 2, 8, 10, 23, and 24 fall within this locality. Archaeological results are consistent with the geomorphic interpretations that indicate a consistent pattern of erosion rather than deposition throughout the Holocene at this location. The late Woodfordian-Holocene interface occurs near the surface ranging from 40-60cm beneath the present surface. Thus, there is little doubt that various components are mixed in Area A. Nonetheless, some functional interpretations of this locality are warranted.

The primary activities reflected in the archaeological materials recovered reflect stone-tool manufacture. High frequencies of lithic debris and associated cores, preforms, and crude bifaces are common (See Tables 2 - 6).

Ceramics, are in notably low frequencies, and those that do occur are often exfoliated, have eroded surfaces, and are less than 1.0cm in diameter. The few sherds large enough for any analyses reflect a Late Woodland manufacture. Thin walled, compact, grit-tempered ceramics with cord-marked surfaces support this conclusion. No rim or cord decorated ceramics were recovered in area A.

Stone tools, aside from bifaces and cores are also quite rare. Two projectile points and a small flake drill complete the lithic assemblage. An irregular cherty dolomite hammerstone, recovered from Feature 3, a Late Woodland hearth, is the remaining stone tool encountered. Hammerstones of any form are quite rare. However, dolomite and sandstone, as well as chert cobbles would have served quite well for this purpose. In addition, wood or bone fabricators may have been used. These implements as well as hammerstones fashioned from igneous rock may have been removed from the "chipping Station" to nearby habitation areas.

Several explanations for the low frequency of ceramics are plausible. First, stone tool manufacturing activity areas seldom yield large samples of ceramics and the ratios reflected in our sample may be valid. Second, however, one must consider that while Woodland era implements are the only diagnostic artifacts, much of the debitage may be from preceramic times. A third interpretation is also feasible. Ceramics may be under-represented simply because they have been exposed to coarse wind-blown sediments. Ceramics in sand blows are rapidly disintegrated and certainly pottery deposited in Area A would have been continuously exposed to such forces. Many of the very small sherds recovered exhibit the eroded surfaces one would expect in such depositional-erosional contexts. Finally, ceramic attrition may have resulted from both plowing and subsequent recreational activities.

The only habitation feature encountered in Area A is the hearth in Units 8-10. This feature also contained a few small Late Woodland sherds. However, bifaces and preforms, a hammerstone, and much debitage reflect that stone processing was the primary activity at this location.

The crude nature of the bifaces and the lack of formal broken tools suggests that Area A served almost exclusively as a stone processing station. It is likely that final stage reduction preforms were removed from this area to nearby habitation sites. Collections of large numbers of projectile points and ceramics ranging from Late Archaic-Late Woodland times were recovered from shorelines below an elevation of 605 feet above sea level. Feature 3 was also below the 605 foot elevation level.

TABLE 2 : Artifact Categories and Frequencies, Unit 2
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	34 3*	41	4 2*	5	13 5*	16	14 6*	17	6	7	7 3*	9	3 1*	4	0						1	1	82 68% 20*	12	10	1	1	25	21	1	1	121
2	52 3*	14	12 6*	3	14 7*	4	52 12*	14	40 21*	11	29 13*	8	23 12*	6	152 49*	40	2	.5			1 1*	.3	377 93% 123*	18	5	10	2					405
3	27 7*	5	13 11*	3	17 9*	3	57 21*	11	17 8*	3	24 14*	5	21 13*	4	326 36*	64	2 1*	.4			5 4*	1	509 98% 125	9	2	3	.5					521
4	34 6*	9	29 12*	8	23 12*	6	45 23*	12	22 10*	6	44 21*	11	45 33*	12	141 53*	37							383 99% 170*			1	.3					384
5	10 1*	11	5	5	6	6	11 4*	12	5 5*	5	12 6*	13	16 7*	17	29 17*	31							94 96% 40*			4	4					98
6	4	24			1	6			1 1*	6			3 3*	18	8	47							17 100% 7*									17
7																																
8	1	100																					1 100%									1
Wall Scr.	4 2*	21	1	5	1 1*	5	3	16	1 1*	5	2 2*	11	2 2*	11	5	26							19 100% 10*									
Unit Total	166	11	64	4	75	5	182	12	92	6	118	8	113	8	661	45	4	.3			7	.5	1482 95% 494*	39	2	19	1	25	2	1	.1	1566

(* indicates raw frequency of thermally altered chert)

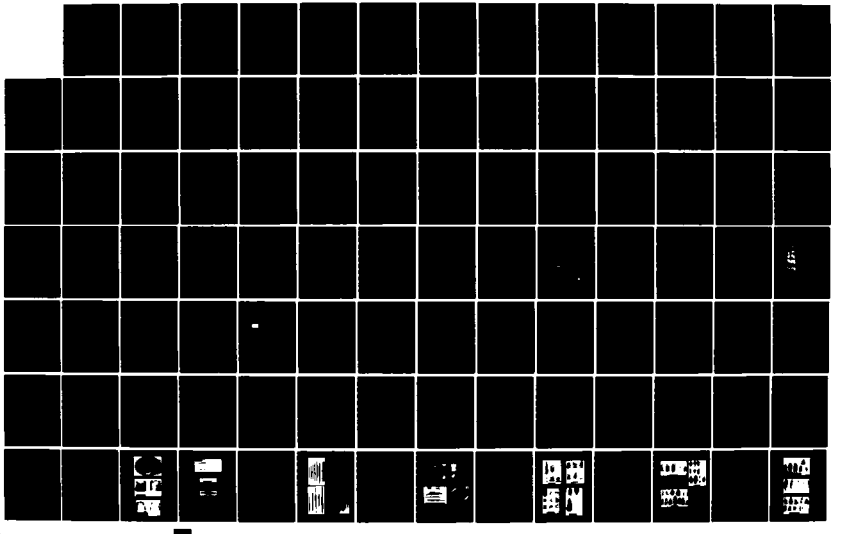
TABLE 3 : Artifact Categories and Frequencies, Unit 8
Osceola Site (47 Gt 24)

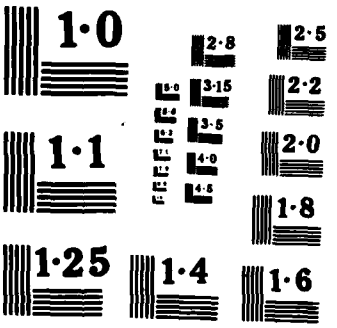
Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	28 2*	72			2	5	3 2*	8	2	5	1	3	2	5					1	3			39 83% 4*	6	13	2	4					47
2	138 6*	78					16	9	3	2	11 2*	6	7	4	1	.6							176 66% 4*	83	31	7	3					266
3	52 5*	60	1	1	1	1	9	10	1	1	4 1*	5	9 3*	10	10	11							87 65% 9*	36	27	4	3	5	4	2	1	134
4	35	51			5	7	8 1*	12	5 1*	7	4 2*	6	11 1*	16							1	1	69 91% 5*	7	9							76
5	26 2*	36	1	1	1	1	9 1*	13	3	4	10	14	18 1*	25	2	3					2	3	72 100% 4*									72
6	12	30	1	3	2	5	7	17	6 1*	15	4	10	6	15	1 1*	3	1	3					40 93% 2*	3	7							43
Unit Total	291 15*	60	3	1	11	2	52 4*	11	20 4*	4	34 6*	7	53 5*	11	14 1*	3	1	.2	1	.2	3	1	483 95% 35*	19	4	6	1	2	.3			510

(* indicates raw frequency of thermally altered chert)

AD-A152 513 ARCHAEOLOGICAL INVESTIGATIONS AT THE GRANT RIVER PUBLIC USE AREA VOLUME 1.. (U) GREAT LAKES ARCHAEOLOGICAL RESEARCH CENTER INC WAUKESHA WI D F OVERSTREET DEC 84 2/3

UNCLASSIFIED 149-VOL-1 DACW25-84-C-0041 F/G 5/6 NL

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1·1
1·25
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2·0
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2·5
2·8
3·15
3·5
4·0
4·5

TABLE 4: Artifact Categories and Frequencies, Unit 10
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° &%	f°	%	f°	%	f°	%	f°	%	
1	76 1*	83					3	3	4 1*	4	4	4	4	4	1	1							92 78% 2*	26	22							118
2	62 3*	65					9 1*	10	4	4	5	5	9	10	4	4					2 1*	2	95 75% 5*	28	22	2	2	1	1	1	1	127
3	62 3*	72	2	2			1	1	9	10	2 2*	2	10 2*	12									86 91 7*	8	9							94
F-3	6 1*	86																			1 1*	14	7 9% 2*	69	86	4	4					80
4	27	59	1	2			8	17	2	4	4 1*	9	1	2	1	2					2	4	46 82% 1*	9	16	1	2	1	2			56
5	27 1*	63					9	21			3	7	2	5	2	5							43 100% 1*									43
6	4 2*	40					2	20			2	20			2	20							10 100% 2*									10
Unit Total	264 11*	70	3	1			32 2*	8	19 1*	5	20 3*	5	26 2*	7	10	3					5 2*	1	379 72% 21*	140	27	7	1	2	.4	1	.2	523

(* indicates raw frequency of thermally altered chert)

TABLE 5: Artifact Categories and Frequencies, Unit 23
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° &%	f°	%	f°	%	f°	%	f°	%	
1	6	60					1	10	1	10	1 1*	10	1	10									10 82% 1*	1	9			1	9			12
2	18 4*	51	1	3	1	3	6	17	2	6	5 1*	14	2	6									35 97% 5*					1	3			36
3	16 13*	47	1	3			4 1*	12	5 1*	15	2	6	2	6	4 3*	12							34 100% 18*									34
4	20 11*	42					5 1*	10	3	6	10	21	8 2*	17	2	4							48 100% 14*									48
5	7	37			2 2*	10	3 1*	16	1 1*	5	2 1*	10			3 2*	16					1 1*	5	19 100% 8*									19
6	8 3*	80			1	10					1 1*	10											10 100% 4*									10
7	1	33									1	33	1	33									3 100%									3
8																																
Unit Total	78 31*	43	2	1	4 2*	3	19 3*	12	12 2*	8	22 4*	14	14 2*	9	9 5*	6					1	.6	159 98% 50*	1	.6		2	1				162

(* indicates raw frequency of thermally altered chert)

TABLE 6 : Artifact Categories and Frequencies, Unit 24
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	2	50							1 1*	25			1 1*	25									4 36% 2*	1	9	4	36	2	18			11
2	8	35	1	4			4	17	3 1*	13	2 1*	9	5 1*	22									23 96% 3*	1	4							24
3	3	27			2	18	2	18	1	9	1	9	1	9							1 1*	9	11 100% 1*									11
4	5 3*	18					4	15	5	18	5	18	8 4*	30									27 100% 7*									27
5	3 2*	13			2	8	5 2*	21	4 2*	16	4	16	6 1*	25									24 100% 7*									24
6							2	40	1	20	1 1*	20	1 1*	20									5 100% 2*									5
7	1	50					1	50															2 100%									2
Unit Total	22 5*	23	1	1	4	4	18 2*	19	15 4*	16	13 2*	13	22 7*	23							1 1*	1	96 92% 22*	2	2	4	4	2	2			104

(* indicates raw frequency of thermally altered chert)

Area A, as defined by remote sensing, soil coring, and excavation is thus interpreted as a lithic workshop where readily available local materials from the lower (cherty) unit of the Galena formation were reduced into bifaces and preforms. Selection of this prominent topographic feature, in close proximity to the source of local raw materials and habitation areas below the 605 foot contour is logical if not empirically demonstrable. Nonetheless, the large numbers of formal tools and ceramics from the nearby floodplain of the Grant River tend to support this conclusion. As well, the instability of Area A throughout much of the Holocene suggests that the terrace was not an area suitable for habitation. Rather, it served as a functionally specific activity area near settlements on the floodplain.

Area B:

Area B is situated immediately adjacent to the present shoreline at the Grant River Recreation Area within 30' of a locality where Mr. Richard Audetat identified a dense concentration of Late Woodland ceramics. The geomorphic context of this locality is not well understood as a significant portion of the Grant River floodplain, below an elevation of 605' above sea level has been eroded and the locality is permanently inundated. Unit 21 (S-401/E-320) was the only excavation attempted in this locality and the unit was abandoned at 60.0cm below the surface owing to water seepage.

Based on the limited excavation, this locality shares many features with geomorphic locality IV. Very dense concentrations of water-rolled pebbles in levels 5 - 6 indicate that this area has been eroded, probably by eolian activity. Unfortunately no diagnostic cultural materials were recovered in unit 21 and we were unable to verify the presence of a habitation area suggested by earlier collection of ceramics by Mr. Audetat. Table 7 denotes materials recovered from unit 21.

Area C:

Area C is coincident with excavation units 19 and 20 (see Figure 14). At this locality, a tight cluster of near surface anomalies was identified with ground penetrating radar and interpreted as a cultural deposit.

Excavation indicates transitory multiple surfaces with at least two associated prehistoric occupations. The first of these is situated at 30-40cm below the present surface and is identified as Late Woodland based on the association of a small triangular projectile point and thin walled, compact, grit tempered, cord-marked ceramics. The ceramics, even though buried by 30.0cm of eolian sediment are badly eroded, a phenomenon we would expect for ceramics deposited in a sand-blow situation.

TABLE 7: Artifact Categories and Frequencies, Unit 21
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	2	33									1	17	3	50									6 50%					6	50			12
2	4	20	2	10			6	30	1	5	2	10	5	25									20 100%									20
3	6	17	2	6	2	6	7	19	5	14	7	19	6	17	1	3							36 97%					1	3			37
4	7	9	1	2	1	2	9 1*	14	4	6	9	14	25	40	5 1*	8			1	2	1	2	63 95% 2*	3	5							66
5	6	10	3	5	1	3	3	10	2	6	8	25	8	25									31 100%									31
6	2	14	1	7			7	50			1	7 1*	3	21									14 100% 1*									
Unit Total	27	16	9	5	4	2	32	19	12	7	28	16	50	29	6	3			1	1	1	1	170 94% 3*	3	2			7	4			180

(* indicates raw frequency of thermally altered chert)

At level 5, an Early Woodland component was identified again, resting upon a transitory surface with no discernable A zone development. Tentatively, this component can be affiliated with the Prairie Phase identified by Stoltman (n.d.) and radiocarbon dated from the Mill Pond site (47 Cr 340) in Crawford County at around A.D. 100 (Theler 1983). Consistent with ceramics of the Prairie Phase series, the portions of two vessels from level 5 are sandy pasted, are incised over a cord-marked surface, and have a series of bosses just below (1.0cm) the lip. One of the vessels has had a cord-wrapped stick applied to the interior lip. All of the sherds compare quite favorably with those illustrated by Boszhardt (1982).

No earlier materials were identified at this locality even though the excavation units were dug to a depth below the Holocene-Late Woodfordian contact. Four small and one large biface fragments and a utilized flake were the only other formal artifacts recovered at this location. From these meager data it is difficult to infer any functionally specific behavior other than biface production at this locus. Tables 8 - 9 provide a tabulation of cultural materials.

Area D:

Area D was first defined by a series of near-surface radar anomalies clustered adjacent to the current bank of the Mississippi River, just north of an old drainage that has been partially obscured by cut and fill activities at the recreation area. Bucket auger investigations confirmed the presence of the cultural deposit and excavation units 17, 18, and 28 were placed in this locality (refer to Figure 14). The horizontal distribution of buried cultural deposits was mapped utilizing ground penetrating radar, resistivity and bucket auger transects.

Excavation reveals a dense concentration of cultural materials, primarily lithic debris with minor amounts of ceramics, from 30.0cm to 80.0cm below the present surface. Unit 28, for example, yielded 3,556 artifacts from ten 10cm levels. No paleosols or incipient A zones were noted beneath the present surface. Features occurred only as very dense concentrations of blocky chert, perhaps as discard piles from prehistoric flint knappers.

Throughout the excavation, core reduction, and, to a lesser degree, biface production represents the primary activity. Tables 10 - 12 present the array and frequency of cultural materials from area D.

Undoubtedly, prehistoric artifacts and those from recent historic times have been mixed in the upper 30.0cm at this location from cultivation, although the disturbance in level 3 is restricted to the upper 3.0cm of that level. Late Woodland ceramics are found consistently in levels 1 - 3 at this locality. The sherds, however, likely represent no more than single vessel. Large, blocky cores are absent

TABLE 8 : Artifact Categories and Frequencies, Unit 19
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° && %	f°	%	f°	%	f°	%	f°	%	
1	3	43			1	14							2 1*	29							1 1*	14	7 29% 2*					17	71			24
2	12	71					3 1*	17	1	6	1	6											17 71% 1*					6	29			23
3	23	62			1	2	3 1*	8	2	5	4 2*	10	2 2*	5					1	2	1	2	37 100% 5*									37
4	7 1*	70			1 1*	10			2	20													10 91% 2*							1	9	11
5	10	48					5 1*	24	2 1*	10	2 1*	10	1	5							1 1*	5	21 100% 3*									21
6	12	50			2 2*	8	5	21			4	17	1	4									24 92% 2*	2	8							26
7	12 3*	60	1	5			1	5	1	5	1	5	4 4*	20									20 66% 7*	10	33							30
8	12 3*	67					4	22			2 2*	11											18 90% 5*									20
9	6 2*	100																					6 100% 2*									6
10	5	83					1 1*	17															6 100% 1*									6

(* indicates raw frequency of thermally altered chert)

TABLE 8 : Artifact Categories and Frequencies, Unit 19
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	3 1*	75											1 1*	25									4 100% 2*								4
Unit Total	105 10*	62	1	1	5 2*	3	21 4*	12	8 2*	5	13 6*	8	11 9*	6					1	1	3	2	170 80% 32*	14	7	5	2	23	11	1	.5	213

(* indicates raw frequency of thermally altered chert)

TABLE 9: Artifact Categories and Frequencies, Unit 20
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	4	57			1 1*	14							2	29									7 47% 1*	3	20	1	7	2	13	2	13	15
2	3	33	1	11			2 1*	22			1	11	2	22									9 75% 1*					3	25			12
3	3	37					2	25			1 1*	13	2 1*	25									8 100% 2*									8
4	14 1*	39	3	8	2 1*	5	7 2*	19	1 1*	3	5 1*	14	4 1*	11									36 88% 7*	1	2			4	10			41
5	17 5*	30	2	4	7	13	10 4*	18	4	7	7 3*	13	9 1*	16									56 75% 13*			19	25					75
6	19	24	2	3	1	1	8 1*	10	3 1*	4	10 5*	13	34 10*	44	1	1							78 80% 17*			20	20					98
7	20 6*	13	4	2	3	2	32 1*	20	19 6*	12	19 4*	12	58 23*	36	4	2					2	1	161 97% 40*			7	3					166
8	15 4*	25	1	2	3 1*	5	8 2*	14	9 4*	15	4 2*	7	19 5*	32									59 100% 18*									59
9	4	22			2	11	1	5	3 2*	17	3 1*	17	5 2*	28									18 100% 5*									18
10	2	50									1	25	1	25									4 100%									4

(* indicates raw frequency of thermally altered chert)

TABLE 9 : Artifact Categories and Frequencies, Unit 20 Osceola Site (47 Gt 24) (cont'd)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
Rod. Run	3	23					3	23					3	23	4	31							13 93%			1	7					14
Unit Total	104	23	13	3	19	4	73	16	39	9	51	11	139	31	9	2					2	.4	449 88% 104*	4	1	48	9	9	2	2	1	512

(* indicates raw frequency of thermally altered chert)

TABLE 10: Artifact Categories and Frequencies, Unit 17
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	1 1*	50									1	50											2 25% 1*					6	75			8
2	11 2*	33					6	18	2 1*	6	3 1*	10	10 3*	30					1	3			33 70% 7*					12	26	2	4	47
3	72 10*	51	2	1	2 1*	1	26 2*	19	4	3	3 2*	2	31 5*	22									140 99% 20*			1	1					141
4	32 4*	47	1	1	4	6	10	15	1	1	5 2*	7	12 3*	18	1	1	1	1	1 1*	1	1	1	68 100% 10*									68
5	43 4*	46	1	1	2 1*	2	8	9	5 1*	5	4 2*	4	20 5*	22	3 1*	3	7	8					93 100% 14*									93
6	28 4*	31	1	1	3	3	4 2*	4	10 3*	11	9 1*	10	35 9*	38	1	1							91 100% 19*									91
7	55 10*	49			2	2	9 4*	8	8 3*	7	5 1*	4	22 6*	19	8 2*	7	2	2	1	1	1 1*	1	113 98% 27*	1	1	1	1					115
8	15 3*	38			2	5	5 1*	13	1 1*	2	16 10*	40							1	2			40 100% 15*									40
9	19 1*	37					7	14	5	10	4 1*	8	14 4*	27	2	4							51 100% 6*									51
10	10 2*	59	1	6			1	6	1	6	2 2*	12	2	12									17 100% 4*									17

(* indicates raw frequency of thermally altered chert)

TABLE 10: Artifact Categories and Frequencies, Unit 17
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	6 3*	86					1	14															7 100% 3*									7
Unit Total	292	45	6	.9	12	2	76	12	31	5	37	6	136	21	49	7	11	2	4	.6	2	.2	655 97% 126*	1	.1	2	.3	18	3	2	.3	678

(* indicates raw frequency of thermally altered chert)

TABLE 11: Artifact Categories and Frequencies, Unit 18
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1																												1	100			1
2	12 4*	55					3	14	1	5	3 1*	14	1	5							2 1*	9	22 31% 6*							30	42	19	27	71
3	67 9*	66	1	1			13 1*	13	2 1*	2	6 1*	6	11 1*	11	1	1							101 95% 13*			2	2	3	3			106
4	78 15*	49	2	1	3	2	26 4*	16	8 1*	5	9	6	29 5*	18	5	9							160 94% 25*	3	2	7	4					170
5	36 6*	55			1	2	9 2*	14	2 2*	3	5	8	10 4*	15	2	3							65 90% 15*	7	10							72
6	15 3*	47					4	13	3	9	3 1*	9	6 1*	19			1	3					32 100% 5*									32
7	13 2*	48			1	4	4 1*	15	1 1*	4	2	7	4	15	1	4	1	4					27 100% 4*									27
8	16 1*	52			1	3	2	6	2 1*	6	9	29	9 1*	29			1	3					31 78% 3*	9	12							40
9	10 1*	63					2	13			1 1*	6	3 1*	19									16 100% 3*									16
10											1 1*	33	2 1*	67									3 100% 2*									3

(* indicates raw frequency of thermally altered chert)

TABLE 11 : Artifact Categories and Frequencies, Unit 18
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
Unit Total	247 42*	54	3	.6	6	1	63 8*	13	19 6*	4	30 4*	7	75 16*	16	9	2	3	.6			2 1*	.4	457 88% 77*	9	2	34	7	19	4			519

(* indicates raw frequency of thermally altered chert)

TABLE 12: Artifact Categories and Frequencies, Unit 28
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	27 3*	47	1 1*	2			11 1*	19	3 1*	5	7 4*	12	8 2*	14									57 68% 12*					24	28	3	4	84
2	71 12*	44	4 1*	2	3 1*	2	18 2*	11	11 2*	7	21 4*	13	30 6*	19	3 1*	19							161 88% 29*	2	1	1	.5	20	11			184
3	236 29*	49	12	2	15 3*	3	80 16*	15	24 4*	5	55 17*	10	84 19*	16	19 4*	4							525 96% 92*	8	1	8	1	6	1			547
4	259 33*	34	5 1*	1	24 5*	3	103 21*	14	55 17*	7	77 23*	10	182 31*	24	38 6*	5	4 1*	.5	2 1*	.3	5 3*	1	754 98% 143*	10	2	4	.5					768
5	192 21*	30	24 2*	4	17 3*	3	90 11*	14	35 13*	5	97 14*	15	157 26*	24	35 7*	5			2 1*	.3	1 1*	.1	649 100% 99*									649
6	116 1*	22	3	.6			50 2*	9	74 3*	14	9 3*	2	84 5*	16	193 12*	36	3	.6					532 100% 26*	3	.5							535
7	122	27	16	3	2	.3	25	5	38	8	20	4	114	25	118	26	1	.2			2	.3	458 99% 35*	6	1							464
8	79 3*	31	6 1*	2			1	.4	32 1*	12	10 4*	4	38 3*	15	93 8*	36							259 100% 20*									259
9	50	42	2	2	3	3	19	16	6	5	14	12	21	18	4	3					1	1	120 98% 27*	2	2							122
10	17 2*	45			4 1*	11	2	5	2 1*	5	4 1*	11	8 1*	21	1	3							38 100% 6*									38

(* indicates raw frequency of thermally altered chert)

from the Late Woodland surfaces and the debitage reflects smaller biface production.

Levels 4, 5, and perhaps 6 can be tentatively associated with a Middle Woodland occupation. Large blocky cores, flake knives, large bifaces, exotic cherts, and a grit-tempered rim with a flat lip, interior rim channeling, and vertical applications of what appears to be a cord wrapped paddle just below the exterior lip were found in levels 4 and 5.

In level 4, however, 2 side notched projectile points were recovered. These are indistinguishable from Osceola or Raddatz Side notched points. One has been reworked and apparently utilized as a knife. The larger specimen manifests only slight basal grinding and the reworked implement has been basally thinned with no apparent grinding. Finally, the medial portion of a rather large drill, similar to those encountered in association with Osceola Side Notched points was also found in level 4. The incorporation of seemingly earlier tool types with the Middle Woodland materials is not unexpected. This is common in other contexts on the Potosi Terrace with its long term instability and significant krotovina.

Level 7 yielded a broken side notched projectile point and a large drill along with broken cores and lithic debitage. The most deeply buried formal implements were recovered from level 9. In unit 28, a small lanceolate biface was recovered. It is basally thinned with very weak shoulders. No grinding occurs on either the lateral margins or on the concave base. Stylistically, it shares some features with Karnak Stemmed points illustrated by Cook (1976), although the Osceola specimen is somewhat diminutive measuring only ca. 3.50cm in length. Thus, although somewhat disturbed and lacking discreet surfaces, cultural stratigraphy is promising at area D.

Area E:

This area lies within geomorphic locus II and incorporates excavation units 3 - 6 (see Figure 14). The relatively minor amount of cultural debris retrieved from this locality that could be associated with prehistoric occupation and utilization fosters the inference that only sporadic and transitory use was made of this portion of the Potosi Terrace. However, the bimodal distribution of prehistoric cultural debris with clusters at ca. 40cm and 80-90cm below the surface denotes at least two surfaces on which cultural materials were deposited. These surfaces of course are likely disturbed and were of sufficiently short duration that pedogenesis was retarded.

The low frequencies of artifacts preclude interpretations related to activities carried out at this location. However, the Late Woodland occupation at the site can be verified by diagnostic ceramic sherds. No additional formal tools or ad hoc tools were recovered. In the lower stratum,

TABLE 13: Artifact Categories and Frequencies, Unit 3
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1													1	100									1 25%					3	75			4
2			1	14			1	14			2	28			2	28	1	14					7 54%			4	30	2	15			13
3	3	50	1	17					1	17	1	17											6 55%			3	27	2	18			11
4							1	33	1	33	1	33											3 30%			7	70					10
5																																
6																								2	100							2
7																																
8					1	100																	1 100%									1
9	1	12													7 2*	88							8 100% 2*									8
10																																

(* indicates raw frequency of thermally altered chert)

TABLE 13: Artifact Categories and Frequencies, Unit 3
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
Wall Scr.	LEVELS		1-5				1	50							1	50							2 100%									2
Unit Total	4	14	2	7	1	4	3	11	2	7	4	14			11 2*	39	1	4					28 55% 2*	2	4	14	27	7	14			51

(* indicates raw frequency of thermally altered chert)

TABLE 14: Artifact Categories and Frequencies, Unit 4
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	8	53					3	20	2	13			2 1*	13									15 52% 1*	8	28	6	20					29
2	4 3*	100																					4 80% 3*	1	20							5
3	2	100																					2 50%	1	25	1	25					4
4	1	100																					1 100%									1
5																																
6																																
7																	1	100					1 100%									1
Unit Total	15 3*	65					3	13	2	9			2 1*	9			1	4					23 58% 4*	10	25	7	17					40

(* indicates raw frequency of thermally altered chert)

TABLE 15: Artifact Categories and Frequencies, Unit 5
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	17 2*	53					8 1*	25			2 1*	6	1	3	4 1*	12							32 34% 5*	48	52	10	11	3	9			93
2	9 1*	19	2 1*	4	1 1*	2	8 3*	17	1	2	4	8	10 1*	21	13 4*	27							48 84% 11*	7	12	2	4					57
Unit Total	26 3*	32	2 1*	3	1 1*	1	16 4*	20	1	1	6 1*	8	11 1*	14	17 5*	21							80 53% 16*	55	37	12	8	3	2			150

(* indicates raw frequency of thermally altered chert)

TABLE 16: Artifact Categories and Frequencies, Unit 6 Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1																															
2	15 1*	30	1	2	1	2	9 1*	18	3	6	5 1*	10	16 4*	32									50 68% 7*	6	8	9	12	8	11			73
3	6	46	1	8			1	8	1	8	3 1*	23	1	8									13 32% 1*	17	41	10	24	1	2			41
4	12	32	1	2			9 2*	24	1	2	4	11	10 2*	26	1 1*	2							38 55% 5*	8	12	18	26	5	7			69
5	9	45					4	20			2	10	5	25									20 51% 2*	3	9	11	31			1	3	35
6	4	50			2	25	1	13	1	13													8 24%	5	15	10	29	11	32			34
Unit Total	46	36	3	2	3	2	24	19	6	5	15	12	32	25	1	1							129 51% 15*	39	16	58	23	25	10	1	.4	252

(* indicates raw frequency of thermally altered chert)

only a few flakes were deposited prior to the Late Woodland occupation. The absence of any diagnostic remains prohibits meaningful interpretation or identification of the pre-late Woodland component at Area E.

The recent trash deposit has limited utility as an heuristic device aside from documentation of recent modifications to the landscape. Finally, data from remote sensing, bucket auger investigations, and excavation all serve to underscore the very limited use of this locality by prehistoric inhabitants of the terrace. Tables 13 - 16 present the frequency and forms of artifacts from this locality.

Area F:

Area F is near the location of a proposed boat ramp and was initially identified by a dense concentration of near surface anomalies. Bucket auger investigations and an excavation unit (22) indicated the source of the anomalies was rocky fill deposited by work crews during the construction of shoreline protection at this locality (refer to Figure 14).

A total of 26 chert waste flakes, all of local Galena formation chert were recovered from 7 excavated 10.0cm levels. No diagnostic materials were encountered and construction of the proposed boat ramp will have no apparent significant impact on archaeological deposits. Table 17 provides a summary of cultural materials recovered from unit 22. Taken together, the remote sensing data, information derived from bucket auger investigations, and from excavation, demonstrate that area F was not the site of significant prehistoric activity or occupation on the terrace.

Area G:

Area G is coincident with geomorphic locus I, the most stable locality identified at the Grant River Public Use Area. While near surface anomalies were not densely concentrated here, the decision was made to excavate a block for reasons previously stated as well as the fact that greater stability seemed evident from auger and test excavations.

Area G was investigated through the excavation of units 1, 7, 9, 11-16, and 25-26. Figure 14 portrays the distribution of these excavation units. As reflected in profiles and plans at this locality, Area G represents a complex series of unstable and often disturbed surfaces. Confirmation of prehistoric activity at this locality ranges from Middle-Late Archaic through recent historic times. In no instance could paleosols be identified with cultural materials. Further, time-depth relationships are inconsistent from one excavation unit to the next. Particular soil zones (refer to Figure 26) occur in a given profile of an excavation unit, and, are absent in contiguous

TABLE 17: Artifact Categories and Frequencies, Unit 22
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1																															
2	1	33									1	33	1	33									3 100%								3
3																															
4	1	50	1	50																			2 100%								2
5	3	33	2	22					1	11	1	11	2	22									9 100%								9
6	7	64					1	9	1	9	2	18											11 100%								11
7									1	100													1 100%								1
Unit Total	12	46	3	11			1	.3	3	11	4	15	3	11									26 100%								26

(* indicates raw frequency of thermally altered chert)

units. Much disturbance can be assigned to small mammal turbation evidenced by the occurrence of three woodchucks (Marmota monax) whose articulated skeletal remains were encountered in old burrows. In these burrows and associated runs, as well as in many smaller rodent burrows, cultural materials were identified as translocated. Often this was possible to define only by recording the orientation of waste flakes, for example resting on side or end.

In spite of the lack of architectural or habitation features, or dense concentrations of cultural debris, single artifacts or artifact clusters were often identified as deposited on a transitory surface. Stratigraphic separation is not easily recognized and there is undoubtedly significant mixing of deposits. Nontheless, diagnostic cultural materials were sufficiently frequent so as to allow reconstruction of historic and prehistoric activity at Area G.

The most recent cultural deposits in Area G can be associated with late 19th to mid-20th century hunting and fishing camps. Historical accounts and conversations with local informants provide evidence of a rather common pattern of construction of simple structures or shacks. Often these were built on a limestone slab foundation and utilized scrap lumber and tarpaper as primary building components. Apparently, according to informants, some of these were heated and some were not. They served multiple functions such as storage of fishing and hunting gear, a place to process fish or animal hides, and, in a few instances were occupied throughout most of the year by a single resident. A local newspaper account (see Appendix D) provides a picture of a mid-20th century structure.

One such structure encountered in Area G fits these descriptions quite well. The shack was constructed on a crude limestone slab approximately 6' by 6'. Lumber construction was obvious and both cut and round nails were in abundance as the structure had been burned. Broken glass (both flat glass and bottles), a few broken dishes, lead sinkers, some fragments of sawed bone, a few brick fragments, and miscellaneous metal items like rivets, tin cans, and a button, exemplify the materials associated with the shack. The earliest artifacts found were several kaolin pipestem fragments and a portion of a single pipe bowl. This structure had apparently been removed by the early 1940's during which time a local resident cultivated the area.

The uppermost 3 levels in area G all yielded Late Woodland ceramics. The sherds are small, having been broken up in the plow zone, but are large enough so that most can be assigned to a Madison ware category and represent local Effigy Mound Tradition occupants. In Level 4 which has escaped recent disturbance from plowing, larger Late Woodland sherds are encountered. Projectile points, cores, and preforms complete the Late Woodland assemblage.

Middle Woodland and Early Woodland materials including both pottery sherds and projectile points are clustered in levels 6 - 8. However, rather than discrete concentrations, these implements are found scattered throughout the locality. Incised over cord-marked pottery, rocker stamped pottery, contracting and straight stemmed projectile points provide for assignment to Middle or Early Woodland contexts. However, it should be noted that side notched projectile points assignable to the types Osceola Side Notched, Godar, and Matanzas are found with later artifact styles and indicate considerable mixing of these materials.

The deepest surface identified at this locality is at approximately 1.2m below the surface. At this level, hammerstones, Osceola points, and lithic debitage were identified on a surface. The distinction here is that these materials are interpreted as resting on an old deflated surface and have not been translocated by burrowing animals, although this phenomenon was noted in many instances.

Throughout the occupational sequence at locality G, the major activity reflected in the artifact assemblage is chert reduction and biface production. A small cluster of animal bone was retrieved from a Middle Woodland context. The remains of fauna identified in Appendix C are in sufficiently good condition that had their occurrence been more widespread, additional samples would have been recovered. A single end scraper, of uncertain context and a few drill fragments represent the only other formal stone tools recovered from Area G.

Tables 13 - 28 provide tabulations of cultural materials by unit and level. Plates XVI - XIX provide representative samples of cultural materials from all localities, and, Figures 32 - 38 depict relative frequencies of prehistoric artifacts by level. The 20th century historic materials, consisting overwhelmingly of nails from the burned shack have been omitted from the frequencies.

Observations on Osceola (47 Gt 24): The "Old Copper" Type Site:

At the time of the discovery of the Osceola Site (47 Gt 24) in 1945 considerable excitement derived from finding copper implements in a subsurface context. Ritzenthaler cogently stated the significance of excavation at an "Old Copper" site:

> While a considerable number of copper artifacts have been found in Wisconsin, only certain types have been definitely associated with known prehistoric cultures of Wisconsin. The rest, obtained as surface finds, have been lumped together and termed "The Old Copper Complex," or "The Old Copper Industry" with the suggestion that they might represent an old culture distinct from any of the four known prehistoric cultures of Wiscon-

TABLE 10: Artifact Categories and Frequencies, Unit 1
Osceola Site (47 Gt 24)

Level	Shatter	Primary Decort. Flakes	Secondary Decort. Flakes	Core Reduction Flakes	Edging Flakes	Bifacial Thinning Flakes	Flat Flakes	Flakes less than 1.0cm	Cores	Ad hoc Tools	Formal Tools	Total Lithics	Rough Rock	Ceramics	Historic	Faunal Remains	Total
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
	6 35 1*			1 7 1*								6 35% 2*		1 6	10 59		17
2	16 40 1*		1 4	3 13 1*	3 13	3 13	3 13				2 8 1*	24 60% 3*		15 38	1 2		40
3	30 56 3*	3 9 1*	4 12 1*	3 9	2 6	3 9 2*					1 3 1*	34 63% 8*		20 32			54
4	6 40 1*		3 20	1 7 1*	3 20	1 7	1 7					15 50% 2*	9 30	6 20			30
				2 18	1 9	4 36 1*	4 36 2*					11 100% 3*					11
	4 20	3 15	1 5	2 10	2 10 1*	6 30 1*	1 5				1 5 1*	20 56% 3*					36
	16 52 2*			3 11	1 4	3 11 3*	3 11	3 11				27 55% 6*	12 25	10 20			49
	12 44 2*			5 19 1*	1 4	2 7 1*	1 4 1*	6 22 2*				27 57% 7*	1 2	18 39			46
9	10 36 1*		2 18	2 18 1*	1 9 1*	1 9	1 9					11 39% 3*	9 32	7 25	1 6		28
	4 40			3 30	1 10		2 20					10 50%	7 35	3 15			20

(* indicates raw frequency of thermally altered chert)

TABLE 18: Artifact Categories and Frequencies, Unit 1 (cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%		fo	%	fo	%	fo	%	fo	%	
11/12	5	21	1	4			4	17	4 1*	17	2	8			6 2*	25	2	8					24 83% 3*									29
13	1	100																					1 25%					3	75			4
14			1	50									1	50									2 100%									2
15															1	100							1 100%									1
16							1	100															1 100%									1
LEVELS 17-22: STERILE																																
Wall Scr.	12				1		3				3 2*										1		19	5		5						29
Unit Total	96 12*	41	8 1*	3	12 1*	5	32 4*	13	16 3*	7	30 11*	13	17 4*	7	18 2*	8	2	1	1 1*	.4	4 2*	2	236 46% 42*	82	46	94	19	15	35			509

(* indicates raw frequency of thermally altered chert)

TABLE 19 : Artifact Categories and Frequencies, Unit 7
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f && %	f	%	f	%	f	%	f	%	
1	1	17																					1 17%			1	17	4	67			6
2																										2	100					2
3	7 3*	58					3 1*	25	1	8			1	8									12 44% 4*	9	33	2	7	4	15			27
4	1	25					2	50					1	25									4 33%			2	17	5	42	1	8	12
5	14	36	4	10	4 1*	10	6 1*	15	1 1*	3	3	8	7	18									39 62% 3*	11	17	9	14	4	6			63
6	28 1*	16	10	6	26	15	25 5*	14	14 1*	8	25 5*	14	49 2*	27					1	.6	1	.6	179 52% 14*	12	4	146	43	4	1	1	.3	342
7	56 1*	22	10	4	37 3*	14	36 1*	14	22 1*	8	29 3*	11	64 3*	24	9 1*	3							265 96% 13*	6	2	5	2	1	.4			277
8	49 3*	28	6	3	13 1*	7	18 2*	10	16 1*	9	19 5*	11	51 1*	29	5	3					1	.6	178 94% 13*	9	5	3	1					190
9	37 6*	23	5	3	3	2	29 2*	18	11 3*	7	20 3*	13	53 1*	33									158 94% 27*	8	5			2	1			168
10	29 5*	33	2	2	3	3	15 3*	17	4	5	10 1*	11	22 2*	25	3 1*	3							88 85% 12*	12	11			4	4			104

(* indicates raw frequency of thermally altered chert)

TABLE 19 : Artifact Categories and Frequencies, Unit 7
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	27 2*	44	3	5	7	11	5	8	2 1*	3	7 1*	11	7	11	4	6							62 100% 4*									62
12	2[illegible] 3*	45					7	15	4 2*	9	1	2	10 3*	21	4 1*	9							47 94% 9*					3	6			50
13	6 1*	33					5 1*	28	1	6	3 1*	17	3 1*	17									18 100% 4*									18
Wall Scr.							1	100															1 50%					1	50			2
Unit Total	278 25*	27	40	4	83 5*	8	152 17*	14	76 10*	7	117 19*	11	268 20*	26	25 3*	2			1	.1	2	.2	1052 80% 104*	67	5	170	13	32	2	2	.1	1323

(* indicates raw frequency of thermally altered chert)

TABLE 20: Artifact Categories and Frequencies, Unit 9
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	114 5*	80			2	1	8	5	2	1	4 1*	3	12 2*	8	1	.6							143 47% 8*	10	3	3	1	105	35	41	14	302
2	29 2*	30	2	2	2	2	21 2*	22	7 2*	7	11 3*	11	23 4*	24							2	2	97 41% 13*	33	14	5	2	100	43			235
3	27 4*	43					9 2*	14	5 1*	8	7	11	14 1*	22	1	2							63 44% 8*	12	8	10	7	57	40			142
4	25 2*	27	1 1*	1	7 1*	7	16 2*	17	10 3*	11	10 1*	11	21 2*	22							4 1*	4	94 56% 13*	9	5	46	28	17	10			166
5	38	28			2	2	19 2*	14	12 2*	9	19 2*	14	38 7*	29	2	2					2 1*	2	132 56% 14*	8	3	91	39	4	2			235
6	38 3*	35	3	3	3	3	13 1*	12	2 1*	2	6 3*	6	35 10*	32	7 3*	6					1	1	108 72% 21*	3	2	37	25			1	1	149
7	44 6*	34	2	2	4	3	15 2*	12	6 1*	5	16 4*	13	36 9*	28	2 1*	2	2	2					127 89% 23*	10	7	4	3	1	1			142
8	40 4*	36	3	3	4 1*	4	9 1*	8	7 1*	6	3 1*	3	38 8*	34	7 2*	6							111 83% 18*	8	6	12	9			3	2	134
9	46 2*	27	5	3	5 1*	3	12 2*	7	10 1*	6	9 4*	5	59 10*	35	23 9*	13							171 90% 29*	14	7	3	2	1	1			189
10	30 5*	29	1	1	4	4	8	8	9	9	4	4	31 6*	30	13 2*	13					2 1*	2	102 86% 14*	14	12	2	2					118

(* indicates raw frequency of thermally altered chert)

TABLE 20: Artifact Categories and Frequencies, Unit 9
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° &%	f°	%	f°	%	f°	%	f°	%	
11	8 2*	17			7	15	4	8	4	8	2	4	20 3*	43	2 1*	4							47 87% 6*	7	13							54
12	14 2*	29			2	4	11 1*	23	1	2	3 1*	6	14 5*	29	2	4					2 1*	4	48 91% 10*	1	2	4	7					53
13	2	12			4 1*	23	2	12	1	6	7	41	1 1*	6									17 74% 2*			5	22	1	4			24
14	2	54					1	16	2	34	1	16											6 100%									6
15	1	11					2	22	5	55							1	11					9 90%							1	10	10
16	1	100																					1 33%					1	33	1	33	3
17																								1	50					1	50	2
Wall Scr.							4	80	1	20													5 63%					3	37			8
Unit Total	459 38*	36	17 8*	1	47 4*	4	154 15*	12	84 20*	7	102	8	342 66*	27	60 19*	5	3	.2			13	1	1281 65% 182*	122	6	219	11	291	15	49	3	1962

(* indicates raw frequency of thermally altered chert)

TABLE 21: Artifact Categories and Frequencies, Unit 11
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° &&	f°	%	f°	%	f°	%	f°	%	
1	4	36			1	9			2	18	1	9			2	18	1 1*	9					11 25% 1*	9	20	6	14	18	41			44
2	6 2	38	4	25	1	6	1	6	3	19	1	6											16 50 2*			16	50					32
3	23	51	1	2	7	15	3	6	7 2*	15	3	6	1	2	1	2					1	2	45 45% 2*	17	17	32	32	5	5			99
4	16 2*	33	1	2	1	2	7 2*	14	1	2	6 1*	12	8 2*	16	8 2*	16			1 1*	2			49 52% 3*	17	18	22	23	6	6			94
5	11 2*	33	1 1*	3	3	9	4	12 2*	12	36	1 1*	3	1	3									33 57% 2*	6	10	14	24	5	9			58
6	30 3*	45	3	4	9 2*	13	1 1*	2	12 1*	18	5 1*	7	7 3*	10									67 61% 13*	6	5	22	20	14	13	1	1	110
7	31 13*	55					9 1*	16	3 1*	5	8 3*	14	5 5*	9									56 54% 23*	1	1	46	45					103
8	9 1*	45					1 1*	5	3	15	4 1*	20	2	10	1	5							20 25% 3*	11	14	49	61					80
9	9	64					1	7	2 1*	15	1	7	1 1*	7									14 44% 2*	4	12	14	44					32
10	1	14	1	14	2	29	2	29	1	14													7 64%			4	36					11

(* indicates raw frequency of thermally altered chert)

TABLE 21: Artifact Categories and Frequencies, Unit 11
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° &%	f°	%	f°	%	f°	%	f°	%	
11	1 1*	6	1	6	2	11	2	11	1	6	3 2*	16	6 2*	33	3 1*	16	1	6					18 75% 6*			6	25					24
12	2 1*	25					4 2*	50					1 1*	12	1	12							8 100% 4*									8
13	3 1*	43	1	14									3	43									7 64% 1*	3	27			1	9			11
14	1	100																					1 100%									1
15					1 1*	33							1 1*	33							1	33	3 75% 2*					1	25			4
Wall Scr.	1	33			2	67																	3 100%									3
Unit Total	148 27*	41	9 1*	3	9 1*	3	47 18*	13	25 6*	7	61 14*	17	34 10*	10	22 5*	6	1 1*	.3	1 1*	.3	2	.5	359 50% 72*	77	11	23	23	51	7			719

(* indicates raw frequency of thermally altered chert)

TABLE 22: Artifact Categories and Frequencies, Unit 12
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	3	15	8 1*	40			2	10	2	10	4	20	1 1*	5									20 41% 2*			2	4	20	41	7	14	49
2	14	36			1	3	3	8	9	23	2	5	3 1*	8	6 1*	15					1	3	39 60% 2*	4	6	6	9	13	20	3	5	65
3	27 1*	37			1	1	10 1*	14	10 1*	14	13 2*	18	9 2*	12					1	1	2	3	73 57% 8*			21	16	30	23	5	4	129
4	28	32	2	2			15	17	9	10	4	5	13	15	16	18					1	1	88 55% 12*	3	2	48	30	20	13			160
5	46 3*	42	2	2	1	1	12	11	13	12	5 1*	4	23 5*	21	7 1*	6					1	1	110 73% 10*	3	2	28	18	10	7			151
6	23	3	5	6	2	3	8	10	8 1*	10	1 1*	1	4	5	26 1*	34			1	1			77 90% 3*			9	10					86
7	21 1*	50							2	5	2	5	2 1*	5	14	33	1	2					42 84% 2*	5	10	3	6					50
8	10	28	1	3			1	3	5	14	1	3	4	11	14 3*	39							36 84% 3*	1	2	6	14					43
9	27 1*	33			2	2	12	15	5	6	3	4	24 5*	30	7	9	1	1					81 93% 6*	4	5			2	2			87
10	18 5*	44					3 2*	7	2 1*	5	4	10	14 3*	34									41 87% 11*	3	6	1	2	2	4			47

(* indicates raw frequency of thermally altered chert)

TABLE 22: (cont'd) Artifact Categories and Frequencies, Unit 12 Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° && %	f°	%	f°	%	f°	%	f°	%	
11	8 1*	21	2	5			5	13	1	3	1	3	4 1*	10	16 2*	42	1	3					38 88% 4*					1	2	4	9	43
12	6	22					3	11	4	15			5	19	9 1*	33							27 96% 1*			1	4					28
13	8	33					3	13			2	8	3	13	8 1*	33							24 100% 1*									24
14	1	16			1	16									4	66							6 100%									6
15													1	100									1 100%									1
Unit Total	240 16*	34	20 1*	3	8	1	77 4*	11	70 4*	10	42 5*	6	110 20*	16	126 15*	18	3	.4	2 1*	.3	5	1	703 73% 64*	23	2	125	13	98	10	19	2	968

(* indicates raw frequency of thermally altered chert)

TABLE 23: Artifact Categories and Frequencies, Unit 13
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° && %	f°	%	f°	%	f°	%	f°	%	
1	4	80											1	20									5 10%	1	2			42	86	1	2	49
2	14	54					3 1*	11	1	4	6	23	2	8									26 27% 1*					70	72	1	1	97
3	16	52					2	6	2	6	1	3	8	26	1	3					1 1*	3	31 37% 1*	2	2	8	10	42	50	1	1	84
4	7	24					6	21	2	7	1	4	11 2*	37	1	4	1	4					29 55% 2*	5	10	3	6	11	21	3	6	52
5	11	22	1	2			2 1*	4	6 1*	12	12 5*	24	15 2*	30	1	2					1	2	49 59% 9*			16	19	15	18	3	4	83
6	6 2*	24					2	8	5 1*	20	4 1*	16	8 1*	32									25 66% 5*	3	8	7	18	3	8			38
7	16	35					4	9	5 1*	11	17 3*	37			1	2	1	2			2 1*	4	46 85% 5*	2	4	2	4	3	5	1	2	54
8	16	31			1	2	8	15	4 1*	8	2	4	6 2*	12	13 3*	25					1	1	51 94% 6*	1	2	2	4					54
9	7	32					5	23	4 1*	18	2	9	3	14	1	4							22 73% 1*	1	3	4	13	3	10			30
10	7	23					2 1*	6	1	3	2 1*	6	6 2*	19	8 3*	26	4	13	1	3			31 88% 7*	2	6	2	6					35

(* indicates raw frequency of thermally altered chert)

TABLE 23: Artifact Categories and Frequencies, Unit13 (cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	1	11											1	11	6 1*	67	1	11					9 90% 1*					1	10			10
12	3	37					2	25					2	25	1	13							8 100%									8
13	1	20					1	20					3	60									5 83%			1	17					6
14																																
15																																
Unit Total	109	32	1	.3	1	.3	37 3*	11	30 5*	10	47 10*	14	66 9*	20	33 7*	10	7	2	1	.3	5 2*	1	337 56% 36*	17	3	46	8	190	32	10	1	600

(* indicates raw frequency of thermally altered chert)

TABLE 24: Artifact Categories and Frequencies, Unit 14
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1											1	100											1 2%					37	82	7	16	45
2	16	69					2	9			1	4	2	9							2	9	23 3%					672	95	13	2	708
3	7 2*	25					4 1*	14	2	7			10	36	4	14	1	4					28 6% 3*			2	.4	421	93	4	1	453
4	4 1*	44					2 1*	22	1	11			2	22									9 9% 2*			4	4	83	80	7	7	103
5	13 1*	37	1 1*	3	4	11	1	3	7 2*	20	6 3*	17	1	3					1	3	1	3	35 42% 7*			11	13	31	37	7	8	84
6	7	23	1	3	5 1*	17	5	17	3	10	8 2*	27					1	3					30 38% 3*			11	14	31	39	7	9	79
7	11	38			1	3	4	14	4	14	3	10	6	21									29 73%	3	7	7	18	1	2			40
8	12	29	1	2	1	2	6 1*	15	5 1*	12	7 1*	17	9 2*	22									41 71% 5*	5	9	4	7	6	10	2	3	58
9	14 2*	38	1	3	1	3	1	3	2	5	16 1*	43					1	3			1	3	37 64% 3*	1	2	15	26	3	5	2	3	58
10	18 3*	64	2	7									3 1*	11	5 1*	18							28 74% 5*			8	21	2	5			38

(* indicates raw frequency of thermally altered chert)

TABLE 24: Artifact Categories and Frequencies, Unit 14
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	3	23					3	23	2	15	4	31	1	8									13 65%			1	5			6	30	20
12	2	25									2	25	3	37	1	13							8 73%			1	9	1	9	1	9	11
13	3	60											2 1*	40									5 83% 1*							1	17	6
14													2 1*	100									2 67% 1*					1	33			3
15																																
Unit Total	110 9*	38	6 1*	2	12 1*	4	28 3*	10	26 3*	9	48 7*	17	41 5*	14	10 1*	3	3	1	1	.3	4	1	289 17% 30*	9	.5	67	4	1289	75	57	3	1711

(* indicates raw frequency of thermally altered chert)

TABLE 25 : Artifact Categories and Frequencies, Unit 15
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	6	30					5 1*	25	8	40					1 1*	5							20 25% 2*			1	1	53	65	7	9	81
2	23 1*	41			1	2	8 2*	14	4 1*	7	9 2*	16	10 2*	18	1	2							56 56% 8*	5	5	15	15	22	22	1	1	99
3	21	29					18 1*	25	17	23	3	4	8	11	6	8 1*							73 61% 2*	23	19	7	6	16	14			119
4	23 2*	42	1	2	3 1*	5	8 2*	15	5 1*	9	2 1*	4	10	18	3	5							55 51% 7*	8	7	9	8	35	32	2	2	109
5	19 2*	36					5	9	2	4	3	6	6	11	18	34							53 48% 2*	7	6	8	7	35	32	7	6	110
6	16	23					8	11	10 1*	14	3	4	16 3*	23	16	23					1	2	70 51% 4*	3	3	58	42	7	5			137
7	19 4*	30	2	3	4	6	10 2*	16	10 2*	16	5	8	12 4*	19	1	2			1	2			64 31% 12*			135	66	5	3			204
8	14 2*	33			3	7	9 1*	21	1	2	2	5	3 1*	7	9 2*	21	1	2	1	2			43 41% 6*	17	16	44	42	1	1			105
9	17	38					1	2	8	18	7 1*	16	11	24			1	2					45 65% 1*	7	10	16	23			1	2	69
10	18	32	1	2			1	2	8	14	4 1*	7	16	29	8	14							56 62% 1*	9	10	20	22	3	3	3	3	91

(* indicates raw frequency of thermally altered chert)

TABLE 25 : Artifact Categories and Frequencies, Unit 15
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	14	37					3	8	4 1*	11	7 3*	18	10 1*	26							1	3	39 93% 5*	3	7							41
12	9	34	1	4			2	8	1	4	1	4	12	46									26 92% 5*	1	4	1	4					28
13	6	32			2	10	2	10	3	16			6	32									19 76%	4	16	2	8					25
14	6	43					1	7	1	7	6	43											14 88%			2	12					16
15	3	50					2	23		1	17												6 86%			1	14					7
Unit Total	214 11*	34	5	.7	10 1*	1	83 10*	13	82 6*	13	53 8*	8	120 16*	18	63 3*	10	2	.3	2	.3	2	.3	637 51% 52*	87	7	319	26	177	14	21	2	1241

(* indicates raw frequency of thermally altered chert)

TABLE 26 : Artifact Categories and Frequencies, Unit 16
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº	%	fº & %	fº	%	fº	%	fº	%	fº	%	
1	157 3*	76	2	1	4	2	7 1*	3	4	2	11 3*	5	17 1*	8					3	1	2 1*	1	207 52% 9*	26	7	1	.3	153	38	11	3	398
2	57 7*	51	2	2	3 1*	3	13 2*	12	1 1*	1	7 3*	6	27 10*	24					1	1			112 61% 24*	8	4	6	3	58	31	1	.5	185
3	41 2*	56	8 1*	11	3 1*	4	6 3*	8	15 2*	21													73 42% 9*	8	5	33	19	48	27	13	7	175
4	52 14*	50	2	2	5 1*	5	10 1*	10	12 1*	11	16 9*	15	7 3*	7									104 41% 29*	7	3	92	36	51	20			254
5	33 6*	37			4	5	9 5*	10	7 2*	8	16 4*	18	18 4*	20			1	1			1	1	89 68% 21*	10	8	26	20	3	3	3	3	131
6	47 4*	49	3	3	7	7	2	2	6 3*	6	24 5*	25	5 1*	5					2	2	1	1	96 77% 13*	13	10	7	6	1	1	7	6	124
7	70 11*	40	1	1	2	1	11	6	5 1*	3	13 4*	7	51 9*	29	22 4*	13							175 57% 24*	33	11	1	.3			95	31	305
8	51	40	3 2*	2	5	4	13	10	12	9	6 4*	5	31 9*	24	5	4					2 1*	2	128 72% 16*	29	16	11	6			10	6	178
9	48	42	4	3	5	4	11	10	11 3*	10	4 1*	3	27 4*	23	4	3					1	1	115 77% 8*	25	17	4	3			6	4	150
10	29 3*	38			2 2*	3	5 1*	6	5 1*	6	6 3*	8	24 5*	31	5 1*	6			1	1			77 81% 17*	14	5	2	2			2	2	95

(* indicates raw frequency of thermally altered chert)

TABLE 26: Artifact Categories and Frequencies, Unit 16
(cont'd) Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
11	25 2*	36	1 1*	2	3 2*	4	9 4*	13	2	3	8 3*	12	18 6*	26	3 1*	4							69 100% 20*									69
12	12 1*	29	4 2*	10	3 2*	7	2	5	1	2	19 2*	45					1	2					42 100% 7*									
13	15	44			1	3	1 1*	3	1	3	1	3	7 2*	21	8 3*	23							34 92% 6*	1	3	2	5					37
14	1	6					3 1*	19					7 1*	44	1	6	1 1*	6			3	19	16 89% 3*	2	11							18
15					1	20	2	40	1	20			1 1*	20									5 71% 1*							2	29	7
Unit Total	538 54*	47	30 6*	2	48 9*	4	104 19*	8	83 14*	6	131 41*	10	240 56*	18	48 9*	4	3 1*	.2	7 1*	.5	10 2*	1	1342 67% 212*	176	9			316	16	150	8	1984

(* indicates raw frequency of thermally altered chert)

TABLE 27: Artifact Categories and Frequencies, Unit 25
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	14	74	1 1*	5	1	5							2	11									19 19% 1*					79	81			98
2	7	58	2	17	2	17	1	8															12 27%			2	5	30	68			44
3	2	50							1	25			1	25									4 44%					4	44	1	12	9
F-5A																								3	4			70	93	2	3	75
4	6	67					1	11					2	22									9 10%	3	3			75	84	3	3	90
5	5	63					1	12			2 1*	25											8 16% 1*					37	76	4	8	49
Unit Total	34	65	3 1*	6	3	6	3	6	1	2	2 1*	4	5	10									52 14% 2*	6	2	2	.5	29	81	10	3	365

(* indicates raw frequency of thermally altered chert)

TABLE 28: Artifact Categories and Frequencies, Unit 26
Osceola Site (47 Gt 24)

Level	Shatter		Primary Decort. Flakes		Secondary Decort. Flakes		Core Reduction Flakes		Edging Flakes		Bifacial Thinning Flakes		Flat Flakes		Flakes less than 1.0cm		Cores		Ad hoc Tools		Formal Tools		Total Lithics	Rough Rock		Ceramics		Historic		Faunal Remains		Total
	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f°	%	f° & %	f°	%	f°	%	f°	%	f°	%	
1	3	60					2	40															5 45%					5	45	1	10	11
2	16	73					2	9	1	5	3 2*	13											22 24% 2*	4	5			59	66	4	5	89
3	24	80					2	6	2	6			2	6									30 16%	1	.5			148	79	9	5	188
4	5	36					2	14	2	14	3 1*	21	2	14									14 14% 1*					82	80	6	6	102
5	6	35					5 3*	29	1	6	2 1*	12	2 1*	12	1	6							17 33% 5*	2	4	1	2	29	57	2	4	51
Unit Total	54	61					13 3*	15	6	7	8 4*	9	6 1*	7	1	1							88 20% 5*	7	2	1	.2	323	73	22	5	441

(* indicates raw frequency of thermally altered chert)

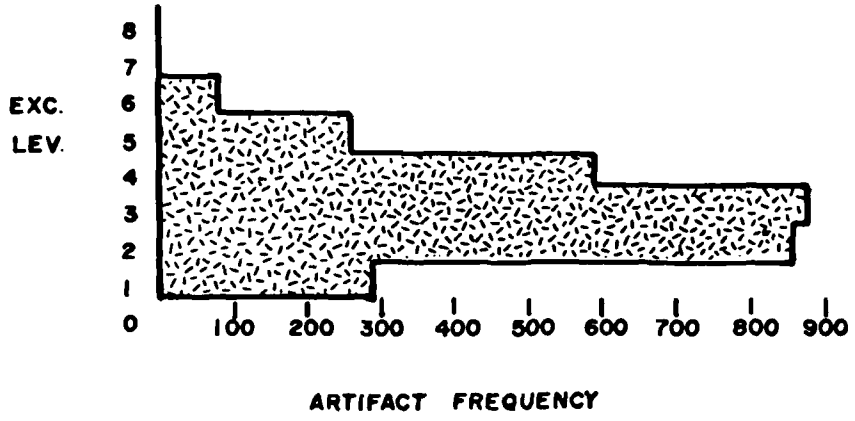


FIGURE: 32 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA A

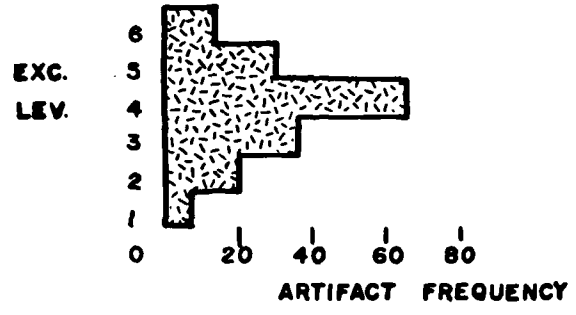


FIGURE: 33 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA B

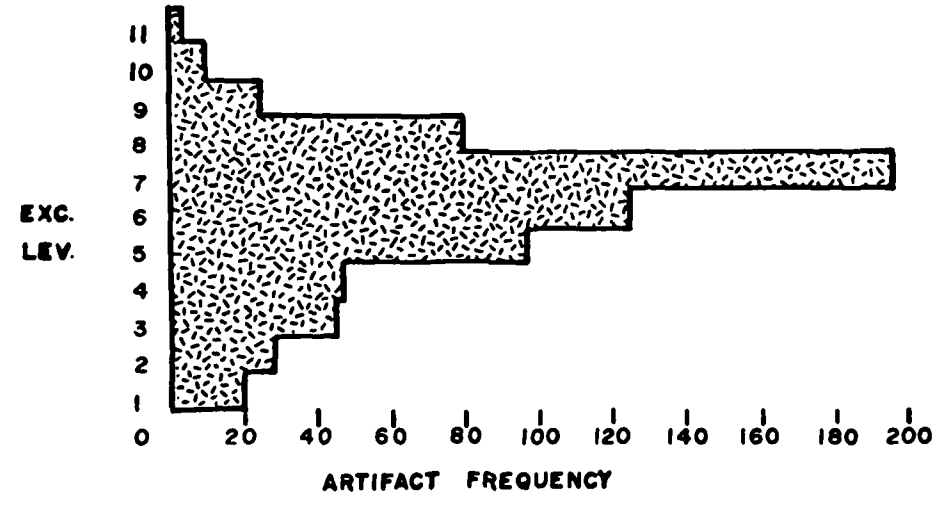


FIGURE: 34 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA C

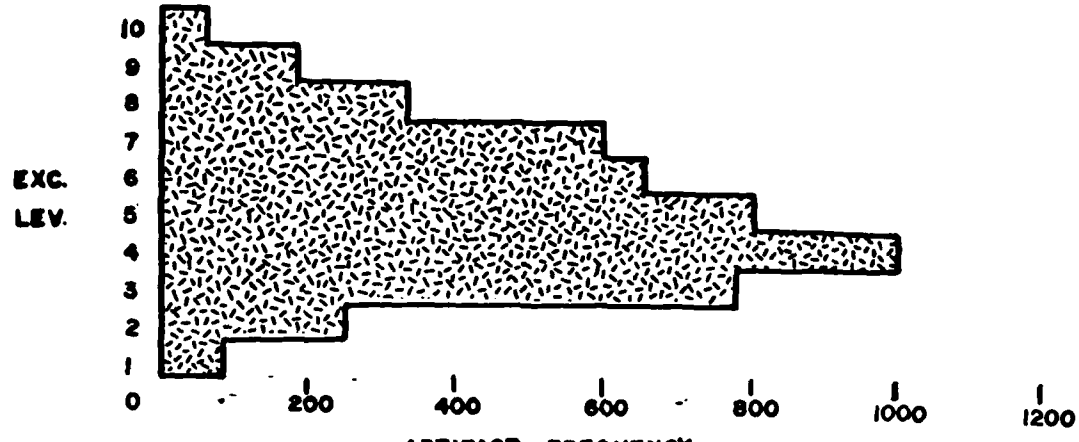


FIGURE: 35 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA D

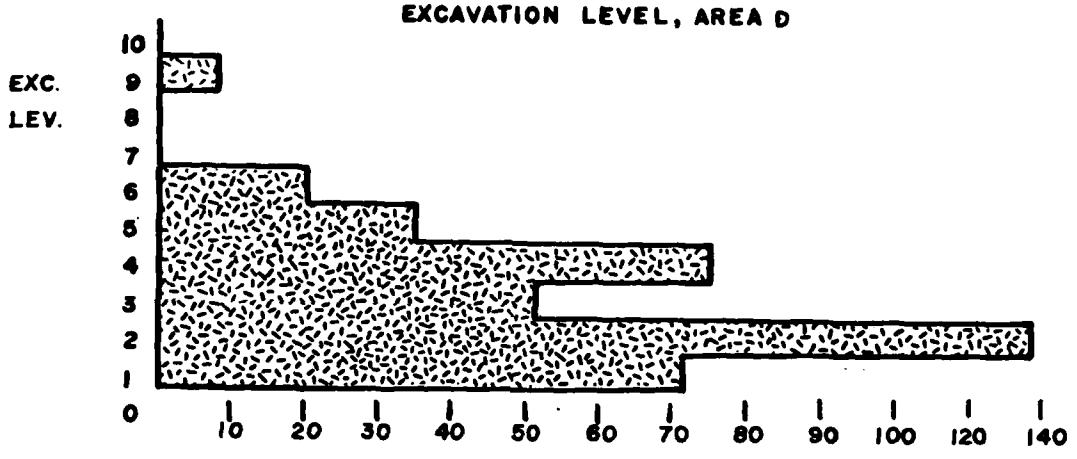


FIGURE: 36 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA E

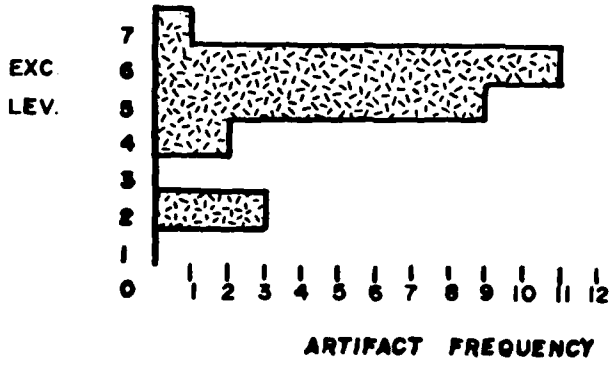


FIGURE: 37 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA F

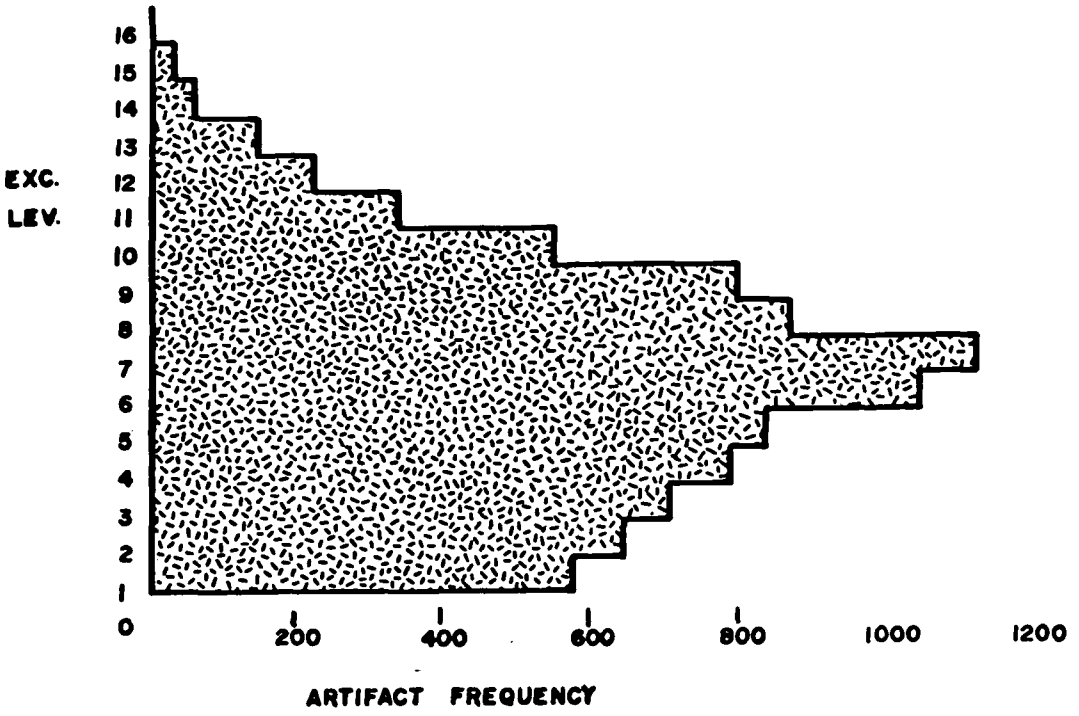


FIGURE: 38 RELATIVE FREQUENCY, PREHISTORIC ARTIFACTS BY EXCAVATION LEVEL, AREA G

> sin. It was known that all four groups made some use of copper with the Hopewellians making the most extensive use of it (1946: 186).

Excavation had been conducted at Woodland, Upper Mississippi, Middle Mississippi, and Hopewell sites in Wisconsin. From these excavation results Ritzenthaler was able to associate particular forms of copper artifacts with each of the four known prehistoric cultures. However, the many surface finds of copper implements which could not be tied to one of the four cultural contexts were, as Ritzenthaler notes, classified as "Old Copper:"

> All other artifacts were tentatively listed as belonging to the Old Copper Complex and included such materials as socketed "spuds" and gouges, rat-tailed spear points and knives, socket-tanged spear points and knives, spatulate-tanged spear points and knives, pikes, fish hooks and harpoons, none of which had been found in situ previous to the discovery at Osceola. This fact accounted for the interest in and the importance of the Osceola site (1946: 187).

From accounts of long-term residents such as Mr. Edwin Goke of Platteville, Ritzenthaler's enthusiasm must have been dampened on his arrival at the site. Skeletal remains had been scattered along the shore and much digging had already been attempted by curious local youths and relic seekers. Nonetheless, Ritzenthaler excavated a preliminary test trench three feet wide and twelve feet long to determine the cultural affiliations, stratigraphy, and depth and richness of the deposits. From these excavations a copper knife, 18 copper awls, some chipped stone artifacts, and skeletal materials were recovered and returned to the Milwaukee Public Museum for analysis (1946: 188).

Formal excavations began in August 1945 and a series of pits were excavated along the eroding bank. Figure 39 is derived from Ritzenthaler's excavation notes and plans and depicts the area subjected to investigation. From his descriptions, the burial pit extended 70 feet along the bank and approximately 20 feet remained of a larger feature which had been washed into the river. Ritzenthaler states:

> The average depth of the pit was 5 feet, and was easily determined by the abrupt change from the black sand to the yellow sand of the old beach. The burials were in the bottom layer from about 2 1/2 feet to 5 feet below the turf. All the copper and most of the other artifacts were found in this bundle-burial layer.
>
> Our method of excavation was to strip a square down to the top of the bundle-burial layer, and

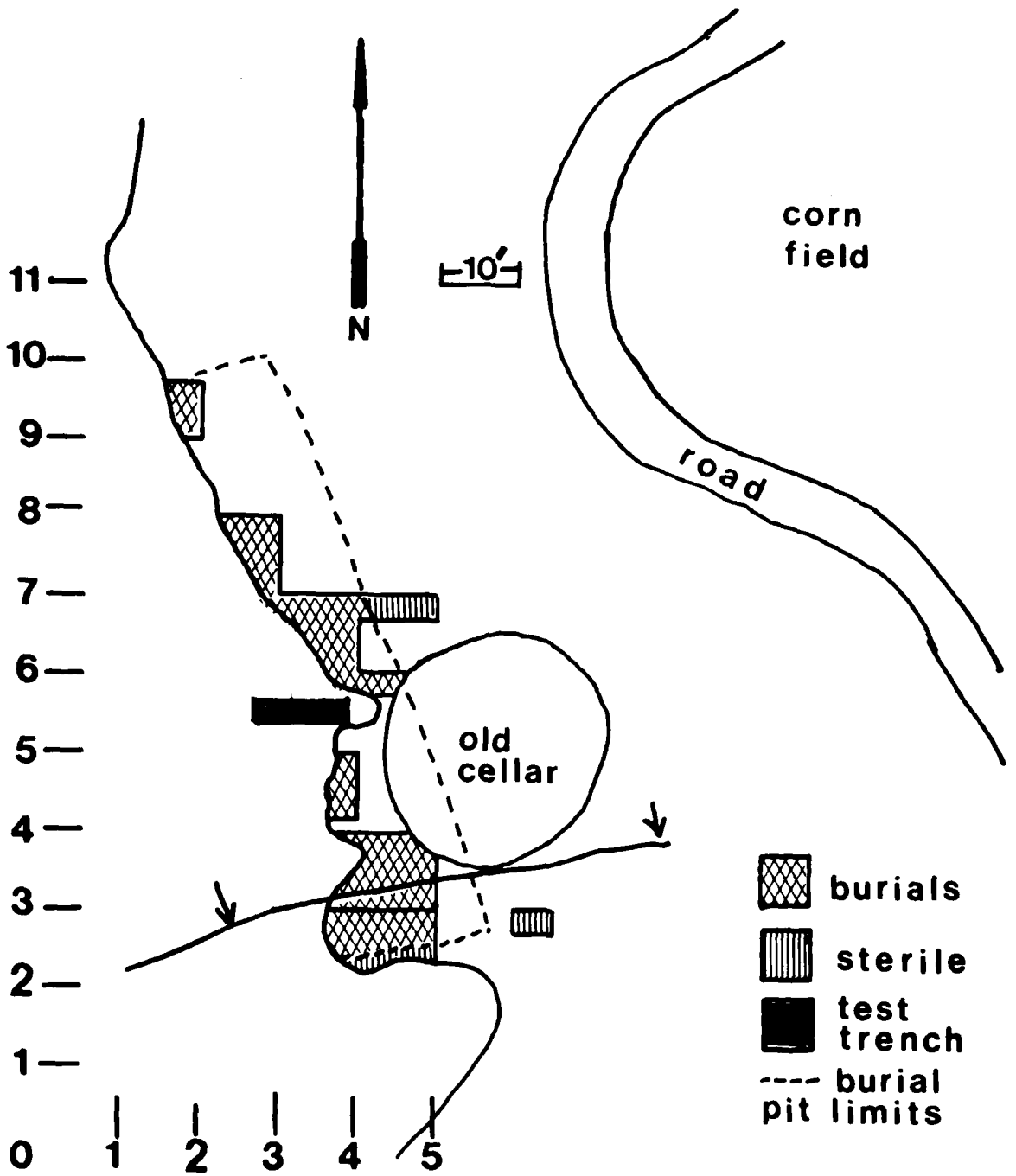


Figure 39 : Osceola Excavation Plan, adapted from Ritzenthaler's 1945 field notes.

> then profile it down to the old beach. The artifacts were scattered through the bundle-burial, layer, in some cases unrelated. The scattering of broken implements, chert chippings, and pottery fragments from a few inches below the turf all the way down to the old beach level indicated that the fill had been taken from a campsite, a Woodland campsite on the basis of the Woodland pottery fragments. These pottery fragments were our first clue as to the relative dating, for they proved that all material in the pit was post-Woodland, or at least contemporaneous with Woodland (1945: 188-189).

Regarding the burial contexts at the Osceola Site he indicated:

> We estimated the number of individuals buried here to be 500. As much of the skeletal material had been dug up and either strewn about the site or carried off before we arrived, this can only be a very rough guess. If the figure is even approximately correct it makes Osceola the largest burial site thus far discovered in Wisconsin.
>
> The burials occurred in a strata running approximately 2 1/2 feet to 5 feet below the turf. In many cases the Osceola artifacts did not occur directly with the burials, but were in all cases in the same stratum. The method of disposal was, with one exception, by bundle-reburial, either single or multiple.

And:

> Besides ordinary secondary reburial we found numerous examples of partial cremation. In three instances we found stone capped graves, in which a layer of small stones was placed (sic) directly over the burial. The one flexed burial, a characteristic Woodland burial technique, occurred at the south end of the pit with the other intrusive Woodland materials. The relatively good state of preservation of the flexed skeleton indicated a much more recent interment than the Old Copper burials (1946: 197-198).

In summarizing the significance of the Osceola Site (47 Gt 24) Ritenthaler suggested:

> Perhaps the major contribution of the site was in the securing of at least a simple cultural complex including Old Copper artifacts. Heretofore such copper artifacts hung in limbo, but Osceola ties

them in with a chipped-stone industry and a burial complex (1945: 203).

Following this first recovery of "Old Copper" artifacts from other than surface contexts, additional "Old Copper" sites were found and excavated in northeastern Wisconsin. The Oconto Site excavations in Oconto County in 1952 and the Reigh Site in Winnebago County, in 1953 provided much additional information on the "Old Copper Complex." Data recovered from the Oconto and Reigh Sites (see Ritzenthaler and Wittry 1957: 22-243, Baerreis, Daifuku, and Lundsted 1957: 244-277, Ritzenthaler, et al, 1957: 278-310, Wittry and Ritzenthaler 1957: 311-328) and other sites in the Great Lakes region (Quimby 1960) fostered some reinterpretation of the Osceola materials.

For example, Wittry and Ritzenthaler in reviewing the Osceola excavations state:

> Fragments of grit-tempered, cord marked Woodland pottery were dispersed in the sand over and to a much lesser extent, in the burial layer. Available data point to the fact that the few sherds found in the burial layer are the result of subsequent disturbance, and should not be considered as part of the Old Copper Complex (1957:313).

They continue:

> There are few specific traits indicative of a close relationship between the Osceola and Oconto sites. The main connection lies in the occurrence of Old Copper implements at both of the sites and certain similarities in the burial patterns. Whereas bundle reburial and cremation were the only methods of burial at the Osceola site, about half the burials at Oconto were of these types and the remainder were primary interments. The Oconto site lies within the area of concentrated distribution of surface finds of the Old Copper implements in Wisconsin, while the Osceola site is situated outside this area. Although the possibility exists that the differences may be the result of the removal of large areas of both sites prior to excavation and hence an incomplete sampling of them, they might also have been caused by geographical or temporal factors (1957: 321).

In their discussion of the Oconto Site Ritzenthaler and Wittry indicate the difficulty of integrating the Osceola data with other Old Copper manifestations:

> The variations apparent at this point could be theoretically accounted for on either spacial (sic) or temporal grounds, or both. Considering

> the special (sic) approach the two sites are at opposite ends of the state some 210 miles apart as the crow flies. If contact were lacking, the variation could easily occur within a relatively short period of time. As to a temporal difference there is no evidence to indicate either that one is older than the other, or that they were contemporaneous. It might be noted that Oconto is near the heart of the Old Copper center as indicated by distributional studies based on surface finds (Wittry 1951: 14, 18) while Osceola exists as a lonely outpost, but is impossible at this point to determine which group was the earlier (1957: 238).

In 1958, Ritzenthaler reported radiocarbon dates derived from human bone from the Osceola and Reigh sites. The Osceola date was 3450 ± 250 years B.P. (Crane and Griffin 1959: 182). This approximate 1500 B.C. date was considered late by Ritzenthaler: "This writer thought the Reigh site date to be about what was expected, but was surprized at the recency of the Osceola one (1958: 174).

With regard to the first issue, the association of artifacts and burials, several factors can be cited which would foster questions regarding the association of most, if not all of the Archaic materials with skeletal remains. First, as previously demonstrated, the Potosi terrace has seen significant deflation following the deposition of Osceola Side Notched projectile points. Translocation of these materials was noted throughout the excavation units. There is no reason why this would not also be the case with copper implements and other side notched points found below or within the bundle reburial feature excavated by Ritzenthaler (1946). Figure 40 is derived from Ritzenthaler's notes. In no instance are copper tools found in intimate association with a particular burial. As an adjunct to this reasoning, the supposed intrusive Woodland burial, may not be intrusive at all. If this line of reasoning is correct, it would serve as an explanation for the position of artifacts in relation to the burials. The artifacts would have been clustered on a deflated surface. This surface, indicative from other profiles on the terrace, was then covered by eolian deposits. At a later date (Woodland times) interments were placed in the knoll-like feature.

If this were the only line of evidence, the data would not be compelling. Fortunately, supplemental information tends to support this conclusion. Recently Sullivan (1983a) has completed an inventory and description of the Human Skeletal remains from the Osceola site. In addition, as part of his on-going research, Sullivan (1983b) conducted analyses relating to enamel hypoplasia in the Osceola burial population. This study of the dentition provides some interesting insights.

Difficulties of interpreting the Osceola site relate to the context of materials encountered with the burials, the

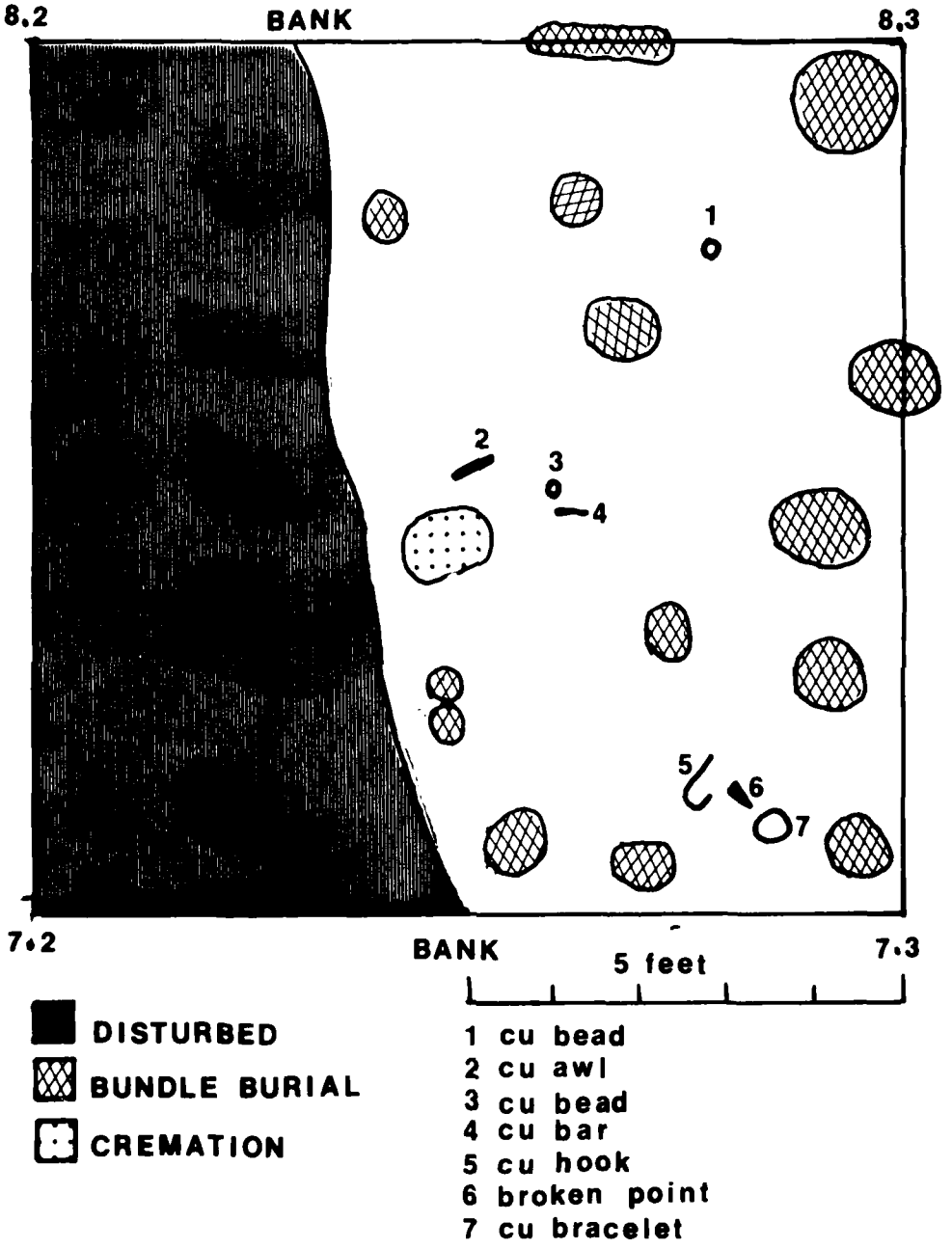


Figure 40: Plan view of Unit 7.2, 1945 excavations, adapted from Ritzenthaler's 1945 field notes.

antiquity of some or all of the burials, site chronology, and the suggested number of burials. Before reviewing the current excavations at the Osceola site, it is instructive to evaluate how others have interpreted Ritzenthaler's report.

Wittry, for example, was among the first to denote possible relationships to mortuary contexts to the south rather than the Old Copper to the northeast. He notes:

> Before the Osceola bannerstones came to light, Titterington (1950) and Bennett (1952) had drawn attention to the similarity of the artifacts from the Hemphill mound in Brown County, Illinois, and those of the Osceola site. The Osceola bannerstones are almost exact duplicates of the two found at Hemphill in 1933 (Knoblock 1939: 210-210) (1951).

Cook, in his definition of both the Titterington and Helton Phases suggests some affinities of Osceola with Hemphill and assigns the occurrence of copper implements to trade relationships (1976: 96-97). Stoltman, on the other hand, chooses to note relationships with Titterington rather than Helton:

> Paralleling the Titterington Phase in parts of Wisconsin and Minnesota is the so-called Old Copper complex, the designation given to an imposing number of widely scattered surface finds of hammered copper. . ." (1983: 214).

This interpretation may, in part, be influenced by the 1500 B.C. radiocarbon date from Osceola.

Unfortunately, the recent excavations at the Osceola Site cannot resolve the three primary issues: (1) the association of artifacts within the mortuary context; (2) the number and age of burials; and (3) the placement of the "burial" component in a Helton or Titterington phase chronological framework. Comparing the Osceola population with Kentucky Archaic skeletal series, and, with Powers Phase Mississippian skeletal remains, Sullivan found: "The rates of enamel hypoplasia in the Osceola Site dental materials are directly comparable to data from Powers Phase Mississippian skeletal remains (Black 1979)" (1983: 5). The rates of enamel hypoplasia in the Osceola population are atypically high for hunting and gathering subsistence and more in line with what we would expect for village agricultural populations. This generalization is tempered with the realization that there is substantial variation in hypoplasia rates from region to region and between populations. Nonetheless, it is sufficient to question a Late Archaic assignment for the 16 individuals in the Milwaukee Public Museum collection.

Resolution of this problem is expected once the results of radiocarbon assay on burned bone from the Milwaukee

Public Museum collections are completed. As an additional test, C^{12}-C^{13} ratios will be analyzed as an evaluation of the enamel hypoplasia data. Accurate dating of the skeletal remains and the dietary information are viewed as an adequate test of the association of the skeletal remains and the copper implements, particularly in light of the new stratigraphic information for the site and Sullivan's (1983a, 1983b) bioanthropological data.

Even a reasonable approximation of the size of the burial population at the Osceola Site (47 Gt 24) is not possible. Guesses range from 1,000 (Telegraph Herald 1945) to 250 individuals.

Sullivan's recent inventory (1983a) identifies slightly more than 53 anatomical elements (see Appendix C). A minimum number of individuals is 16, based on the most frequently occurring element, the right mandibular first molar (1983a: 2). Based on our exhaustive survey of private collections from the site this number could be increased by no more than a half-dozen individuals. Thus, the empirical realities come no where near the guesses. Ritzenthaler does note that much of the bone was in very poor condition: "In many cases even the teeth, the most dense part of the human body, would crumble if held lightly in the fingers." And, "In instances only fragments of bone were preserved due to contact with copper (1946: 198)." Our examination of the Milwaukee Public Museum collections indicated material only in relatively good states of preservation and only one long bone fragment stained and preserved by copper salts. Therefore, these investigations cannot provide any significant information relating to the number of individuals which appears greatly inflated.

The third interpretive problem, that of absolute chronology at the Osceola Site (47 Gt 24) is no longer significant. If one focuses only on the radiocarbon date from the University of Michigan Memorial-Phoenix Project Radiocarbon Laboratory, run on human bone, Stoltman's assignment of the site to Titterington phase is plausible (1983). However, the stratigraphy at the site is complex, with at least two post-Late Archaic episodes of deflation and subsequent translocation of artifacts. As well, since the time of Ritzenthaler's report, artifacts have been recovered from the shoreline indicative of Late Archaic, Early Woodland, Middle Woodland, Late Woodland, Oneota, and historic occupations. The major interpretive problems at the Osceola site are those of context of association and not absolute chronology. Assuming that the copper artifacts from the Osceola site are in fact mortuary items, they could have been associated with either Helton or Titterington mortuary behavior and there are no good reasons to prefer one or the other. In summary, the most plausible explanation is that the prominent knoll functioned as a mortuary area utilized over a long period of time. The site does not represent a large Old Copper burial site. Rather, inhabitants from the nearby floodplain residential

localities used the prominent knoll for disposal of human remains. Figure 41 depicts the configuration of the knoll (which looks very much to me like "potted" woodland mounds) from Rock Island District 1 foot contour interval, plane table maps compiled in 1940. Fully articulated burials, partial and perhaps more complete cremations, bundle reburials and the variety of artifacts ranging from Archaic to Woodland times are simply a reflection of mortuary programs across an extensive temporal span.

Reinterpretation of the Hog Hollow Excavations:

Fortunately, we were able to re-examine the stratigraphy at the Hog Hollow Site (47 Gt 266). As indicated in Figure 41, there is ample evidence of a deflated surface at approximately 50cm below the surface. There are no significant flood deposits at the Hog Hollow Site. In his summary of the 1975 excavations Geier relates:

> Stratigraphy, the vertical and horizontal association of features, and the distribution of cultural debris, suggests that the site has only a single cultural component. No over-lapping features were identified and each has essentially the same stratigraphic relationship (1978: 157).

As Figure 42 demonstrates, the stratigraphy at Hog Hollow is essentially the same as that found at the Grant River Recreation Area. The reason that cultural debris is concentrated in the same stratigraphic relationship is that artifacts have, through the processes of deflation, been redeposited on the same surface. The occurrence of Early, Middle, and Late Woodland ceramic types simply provides additional evidence for this interpretation. Finally, the nomenclature presented by Geier (1978) including such "types" as Osceola Bluff Cord Marked and Grant River Cord Marked should not be utilized as these types can easily be accommodated within existing typological frameworks.

Given these factors, we are able to review Geier's conclusions regarding the so-called association of Early, Middle, and Late Woodland ceramic traditions at the Hog Hollow Site (1978: 221-222). Four tentative interpretations were based on ceramic and stratigraphic evidence. These were: (1) all three ceramic traditions were practiced simultaneously; (2) post-marital residence patterns were patrilocal, females carried respective ceramic technologies into the residential group at Hog Hollow; (3) ceramic traditions represented variation in kin group traditions; and (4) active trade between neighboring cultural units account for ceramic diversity. Reinterpretation of the stratigraphy at Hog Hollow provides sufficient data to reject all four interpretations. Rather, the variation in ceramics is clearly a function of temporal segregation. Redeposition by eolian activity caused mixing of ceramics manufactured over a

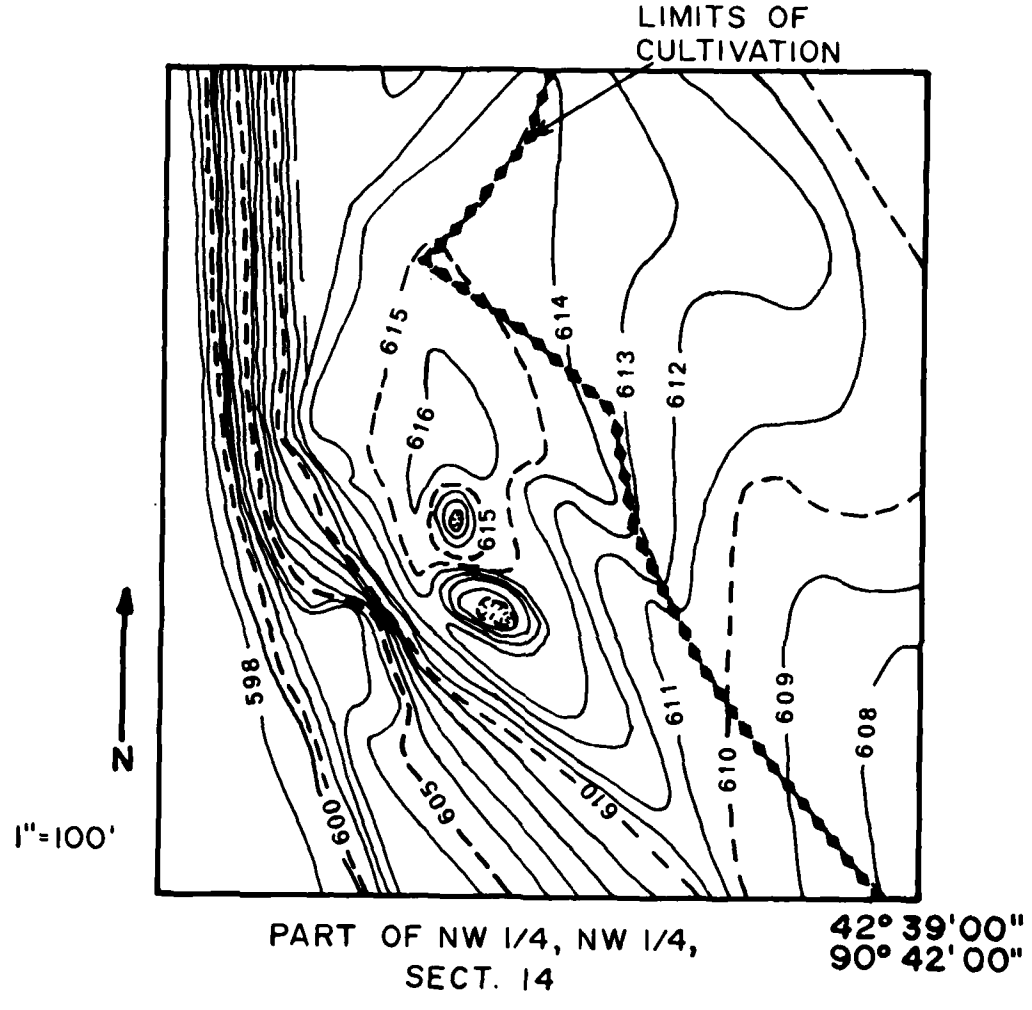
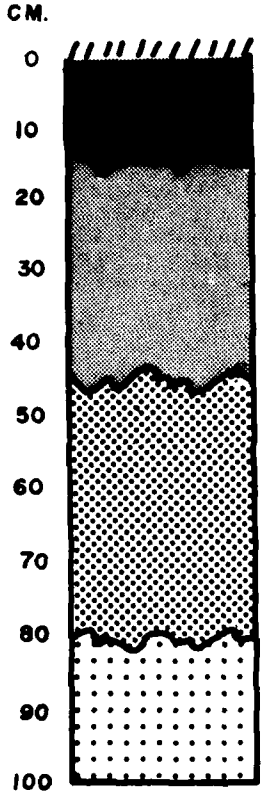


Figure 41: Configuration of the Osceola "knoll" prior to Ritzenthaler's investigation (data from 1940 1' contour plane table maps, Rock Island District, U.S. Army Corps of Engineers).

HOG HOLLOW PROFILE



10YR2/2-2/3 ORGANIC MATTER RICH SILT WITH MINOR FINE SAND & CLAY (LOAM) NON-CALCAREOUS CLEAR WAVY BOUNDARY

7.5YR3/3 SILTY SAND NON-CALCAREOUS CLEAR WAVY BOUNDARY

7.5YR4/4 SILTY SAND NON-CALCAREOUS

CLEAR WAVY BOUNDARY

7.5YR5/4 SILTY SAND NON-CALCAREOUS

Note: Soil pit was excavated 40.0m northwest of previous excavation (Geier 1978) in a wooded area, probably never cultivated. No overbank deposition is observed at the soil pit. At 100.0m N.N.E. of pit, downslope with a drop in elevation of 2.0m, overbank deposits were observed. Bank profile produced a chert flake 1.20m below surface and a banded clay enriched horizon at 1.60m. Site floor is between 1.20 and 1.60m.

Figure 42: Profile from 1984 investigation at Hog Hollow (47 Gt 266).

period of approximately 1,000 years. Finally, the proposition that Madison wares have an origin in communities having historical associations with groups practicing both "Dane and Havana patterns of pottery manufacture" is rejected (see Geier 1978: 222). The Hog Hollow Site (47 Gt 266) is appropriately interpreted as a multi-component site rather than a single component reflecting a Middle to Late Woodland transition.

OCCUPATIONAL HISTORY OF THE GRANT RIVER PUBLIC USE AREA:

From the survey work, both avocational and professional, and from excavations on the Potosi terrace (Ritzenthaler 1946, Geier 1978), a relatively comprehensive account of the prehistoric and historic occupational history of the recreation area can be compiled. Cultural materials and features from surficial and excavated contexts portray utilization of this locality during Late PaleoIndian, Early Archaic, Middle-Late Archaic, Early Woodland, Middle Woodland, Late Woodland, and recent historic times.

PaleoIndian:

Only a few Late PaleoIndian artifacts have been recovered from the Potosi terrace, all from surface contexts. Those we have examined appear to have been manufactured from local Galena cherts, and notably, are characterized by transverse rather than colateral flaking. As most of the terrace has seen various periods of instability, it is unlikely that such cultural remains will be found in context in other than localities where they could be buried intact under alluvial fans. (See Plate XVIII) From the minimal information we can do little but document minor presence of these early inhabitants on the terrace. From the meager data it appears that Late PaleoIndian materials are restricted to relatively high elevations on the terrace.

Early Archaic:

Several artifact styles reflect the presence of Early Archaic populations at the Grant River Recreation Area. Projectile points related to the St. Charles or Dovetail varieties, Hardin Barbed, Thebes, and bifurcate stemmed forms are found at scattered localities on the Potosi terrace. Again, all the illustrated items have been recovered from surface contexts in cultivated fields, or, from foreshores periodically exposed along the terrace margins (see Plates VII and X).

The occurrence of these projectile point styles related to Early Archaic occupation is not unexpected and serves as an interesting contrast to the only excavated Early Archaic (Hardin Barbed) component in the region, the Bass Quarry Site (Stoltman, Behm, and Palmer 1984: 197-224). The authors note that:

> Distributional data from southern Illinois suggest that the primary adaption of Hardin Barbed point makers was to secondary stream and upland habitats (Luchterhand 1970: 33-34), so that their penetration of the Grant County uplands would have involved no notable adaptive adjustments other than a simple, and presumably natural, northward expansion of their geographic range (Stoltman, Behm, and Palmer 1984: 202).

While it comes as no surprize that these implements are found on the Potosi terrace adjacent to the Mississippi River as the Bass Site is situated but a few miles distant, we are unable to offer any meaningful interpretation of the Early Archaic activities. Perhaps evidence of Early Archaic habitation have not yet been revealed on the floodplain owing to site burial.

Middle/Late Archaic:

So-called "Old Copper" implements including spuds, spears, knives, awls, and decorative items along with side-notched projectile points of the Osceola Side Notched, Matanzas, Raddatz, and Godar styles have been recovered from surface and sub-surface contexts at the Grant River Recreation Area. In addition, various ground stone implements such as axes, celts, mauls, and bannerstones have been recovered here. These artifacts, both on stylistic and chronological grounds can be associated with Middle-Late Archaic cultures. Two major aspects of Middle-Late Archaic behavior have been demonstrated from the Grant River Public Use Area, lithic processing and mortuary behavior. Unfortunately, no extensive data have been recovered which would be of use in reconstructing subsistence or other habitation information. Our suspicion that habitation areas would have been situated on the Grant River floodplain can not be tested as this portion of the site has been destroyed.

Using Cook's models of maintenance and extractive tasks for Helton and Titterington Phases in Illinois and Missouri, (1976) several tasks can be suggested. These include chert, ground stone, and shell item manufacture, wood item manufacture, quarrying, hunting, hide and leather preparation. Unfortunately, these suggested tasks have minimal confirmatory evidence in the way of faunal remains. Tools associated with plant extraction and processing and floral remains are virtually nil. In part these limitations certainly derive from the deflated nature of the site, and in part likely reflect a true absence of these activities. Overwhelmingly, the recovered assemblage is positively correlated with chert reduction and stone tool production. Plates I - VII illustrate Middle-Late Archaic materials from the Grant River Public Use Area.

Woodland:

Analyses of ceramics evinces occupation throughout most of the Woodland continuum at the recreation area. To a lesser degree, ceramic interpretations are confirmed by stone tool forms often associated with particular ceramic types. However, the range of styles of formal stone tools is somewhat less than that noted for ceramics. As data from Hog Hollow, part of the public use area, require some clarification owing to incorrect nomenclature, liberal reference is made to ceramic styles identified for that locality (Geier 1978).

Early Woodland:

Early Woodland use of the terrace is manifest by incised over cordmarked ceramic styles and contracting and straight stemmed projectile points (Waubesa Contracting Stemmed, Kramer Stemmed). These materials can be associated either with the Ryan Phase (complex) identified by Benn (1979) or the Prairie Phase defined by Stoltman (n.d.).

Theler (1983) has presented a model of Prairie phase subsistence and settlement that documents intensive utilization of fresh water mussels. Settlements on terrace and upland settings along the Mississippi River are rare. Other than procurement and processing of local chert, we are unable to ascertain other Early Woodland activities at the Potosi terrace. Nor, for that matter, are the data reported by Geier (1978) of much use in reconstructing Ryan or Prairie phase occupational characteristics at this locality. However, the relatively large ceramic sample is suggestive of activities other than stone tool manufacture. Plates XIII - XV depict Early Woodland cultural materials from the Potosi terrace. It should be noted that the ceramic types Osceola Bluff Cord Marked and Brock Lake Incised Over Cordmarked (Geier 1978) are easily accommodated within the Ryan and Prairie phase ceramic series.

Middle Woodland:

Ceramic styles correlated with the Havana series in the Lower Illinois River Valley are commonplace on the Potosi terrace. Such types as Sister Creeks Punctated, various zoned dentate stamped styles, and cord-wrapped stick stamped ceramics have been reported from Hog Hollow (Geier 1978). One would expect that the riverine habitat of the Grant River would have provided an ideal setting for intensive harvest collecting subsistence mode demonstrated for Havana Tradition populations to the south (Struever 1968). Only a few diagnostic projectile points have been recovered, although the unreported lithic assemblage from Hog Hollow would likely expand this sample. Flake knives, on the other hand, are numerous.

Late Middle Woodland artifacts from the Grant River Recreation Area are limited in number. A few sherds can be associated with Millville/Allamakee phase occupation (Benn 1979, Stoltman 1979). In addition, expanding stemmed points similar to those recovered from the Millville site (Freeman 1969) and to Steuben points in Illinois, have been found in both surficial and excavated contexts at the recreation area. Undoubtedly, a critical review of Geier's (1978) excavated material from Hog Hollow would expand this sample.

Finally, a few vessels of Lane Farm Cord Impressed pottery can be identified in surface collections. In addition, Geier (1978: 213-214) illustrates ceramics within the general category of Madison Ware that appear to be cord impressed over a smoothed surface and can be placed within the Lane Farm series. Some of the rocker-stamped body sherds included in his Havana series may represent additional Lane Farm materials. Again, the disturbed contexts from which these materials have been recovered prohibit other than cultural-historical interpretations of Middle Woodland remains (refer to Plates XIII and XV).

Late Woodland:

Late Woodland occupation of the Grant River Recreation Area is extensive. Cord-impressed ceramics that can be placed within the Madison Ware grouping are identified from many localities. At Hog Hollow Geier (1978) notes the numerical superiority of Madison Ware vessels, 24 of a total of 87. Small triangular projectile points also occur frequently in excavated and surface collected samples. This increase in the frequency of Late Woodland materials is consistent with current models that posit both the increase in population size and the exploitation of upland localities for agricultural practices (see Stoltman 1983, Theler 1983, Hall 1980). Unfortunately, data from floodplain and terrace contexts are inadequate to confirm these models. Plate XIV depicts Late Woodland materials from the Grant River Public Use Area.

Oneota:

Archaeological survey and testing on the floodplain and terraces of Navigation Pools 10, 11, and 12 provide ample evidence that Oneota components occur rarely, and, appear to be limited to small, transitory campsites (see Stoltman et al 1982, Boszhardt and Overstreet 1982, Overstreet 1984, Overstreet n.d.). Nonetheless, a few sherds have been found in both lowland and terrace contexts. We do not wish to attempt interpretation of these phenomena save to suggest that the material remains are consistent with very transitory occupation. Plate XIV depicts Oneota materials from the Grant River Public Use Area.

Historic Period:

From a review of local collections, excavated site assemblages and the regional literature, this locality was not an area of Historic aboriginal or Euro-American utilization until relatively late in the Historic period. Further, the late occupation is largely associated with aboriginal and Euro-American exploitation of the lead resources of the region. Except in a few cases near Dubuque, lead mining activities are concentrated, as one would expect, in upland areas near the ore sources.

Commerce, following the development of steamboating on the river stimulated settlement and development during the mid-19th century. At that time Osceola Landing, along with other settlements at Sinnippee and Peru, was the location of a small settlement. Cholera epidemics resulted in the abandonment of these river landings during the mid-19th century. Apparently the Osceola Landing settlement has been destroyed by erosion.

The value of this brief cultural-historic framework is hindered by the fact that much of the information was retrieved from disturbed contexts. However, review of the existing information is useful in focusing on variations of use of the region. It is likely that habitation was very limited until approximately Middle Archaic times. Extensive presence is noted for prehistoric cultures through the Late Archaic and Woodland periods. Oneota and Historic Aboriginal landuse of this locality for whatever reasons is insignificant. Finally, early commerce on the river resulted in late historic period settlement of short duration, truncated perhaps by cholera epidemics of the mid-19th century. Agricultural features and those associated with sport and commercial fishing were obscured by the inundation of the landscape subsequent to lock and dam construction.

SUMMARY AND CONCLUSIONS:

Archaeological investigations at the Grant River Public Use Area were disappointing in some respects. One of the major limitations is the mixed and disturbed nature of the archaeological deposits in many locations. Holocene climatic events and man's activities on the Potosi Terrace have operated in tandem to remove vegetation from the terrace surface and accelerate deflation of the loose sandy matrix. Thus, even though multiple buried surfaces can be identified at the recreation area, considerable mixing has occurred prior to burial of archaeological materials by eolian activities. A second disappointing facet was the apparent absence of features and materials indicative of habitation. The inescapable conclusion from excavated data is that the terrace was not the site of domestic activities, save perhaps the Hog Hollow locality and the minor portion of the recreation area situated below an elevation of 605 feet, throughout the long occupational history of the terrace. In part,

this is likely a function of the fact that with its unstable, exposed surface, the terrace was not a very desirable locality for domestic activities. Rather, available data indicate that the now inundated floodplain of the Grant and Mississippi Rivers was the preferred habitation locality and the terrace was utilized for rather functionally specific purposes. This phenomenon has some implications for contemporary models of subsistence and settlement in the Upper Mississippi Valley.

Additionally significant is the geomorphic history of the terrace which indicates instability throughout the middle to late Holocene. This is inconsistent with models of late Holocene climate and one would expect that subsequent to approximately 4000 B.P. more moist and cooler conditions would have resulted in stabilization. At the Grant River Public Use Area, stabilization and soil development appears to have occurred only after Late Woodland abandonment of the terrace.

Finally, the Potosi Terrace and Grant River environs provided immediate access to two important economic commodities during much of the occupational history of the site. Cherts from the lower unit of the Galena formation and galena cubes are available locally in great abundance. Undoubtedly, their easy extraction and abundance made the Potosi Terrace an important locality with regard to regional exchange systems most notably from Late Archaic through Middle Woodland times.

Perhaps the most gratifying results of the investigation were the opportunities to evaluate previously collected and reported data from the Osceola (47 Gt 24) and Hog Hollow sites (47 Gt 266) (Ritzenthaler 1946, Geier 1978). These positive aspects of the research are summarized below.

Resource Exploitation and Regional Exchange:

Walthall (1981) has summarized the distribution and utilization of galena sources and notes that the Upper Mississippi Valley deposits, the lead mining region of southwestern Wisconsin and adjacent states, were the source of materials widely traded during Late Archaic-Early Woodland periods. He notes occurrences ranging from Ontario to the lower Mississippi Valley (1981: 37).

Wittry (1951, 1956), Quimby (1960), and Goad (1978, 1979), among others, have focused on the distribution of Great Lakes copper. Perhaps most germane to this discussion is Wittry's study which notes the relative frequencies of copper implements in Wisconsin counties. North-east and east-central Wisconsin represent the core-area of Archaic copper implements. Survey work conducted by Neil Ostberg (personal communication) over a twenty year period indicates that the copper bearing regions of the Upper Michigan Peninsula have yielded many indications of copper extraction and processing, but, as one moves to the south into Wisconsin, frequencies of finished artifacts increase and

numbers of implements indicating various stages of production decrease. Finally, Quimby (1960) provides a more expansive summary of "Old Copper" sites and copper mines in the western Great Lakes.

A recent study by Stoltman, Behm and Palmer (1984) identifies properties of local Galena formation cherts from the perspective of the Bass Site, a Hardin quarry in Grant County. In addition, Behm (n.d.) has conducted studies on heat treatment of Galena cherts. Results of these studies note that Galena cherts when heat treated assume a pink-grey hue with surface luster and are easily distinguished from unheated materials. The latter maintain a rather chalky surface texture and light grey to light brown hues. As an adjunct to this investigation, collections of private individuals, Great Lakes Archaeological Research Center, Inc., and the Milwaukee Public Museum collections from northeastern and north-central Wisconsin were examined. There is little doubt that much of the material recorded from archaeological contexts in these areas as "exotic" chert is derived from the lower unit of the Galena formation.

With these factors in mind, the role of commodities readily available to Archaic and later residents at the Grant River Public Use Area is reviewed. Operating from the presupposition that long-distance trade networks are well established by Late Archaic times, local residents of the Osceola site would be in an enviable situation. First, and here the assumption is made, albeit with little data, that the floodplains of the Grant and Mississippi Rivers represent an ideal hunting and gathering habitat, the Osceola residents were situated directly on a main communications and trade artery--the Mississippi River. Second, two significant commodities, galena and chert, were at the immediate disposal of the site's inhabitants.

The inundation of the suspected habitation area at the Osceola site prohibits any in-depth analyses or quantification of regional exchange practiced by the Archaic residents. Nontheless, ties to northeastern Wisconsin can be reconstructed from two lines of evidence. First, the occurrence of copper implements, some of which may have been in mortuary contexts, is evidenced by Ritzenthaler's excavations (1946) and by review of private collections from the Osceola site. Second, the cursory examination of collections indicates high frequencies of both side notched and stemmed points made from Galena chert from northeastern and east-central Wisconsin, an area considered chert "poor." Local lithic sources in the "Old Copper" area include quartz cobbles, glacial cobbles, poor quality cherts from the Niagara escarpment, and argillaceous dolomite associated with the Maquoketa formation on the east shore of Green Bay. Rhyolites were also utilized in this region, although use seems restricted to Late PaleoIndian times. Thus, a major element of exchange that is easily identified is the movement from Osceola to the northeast, likely by way of the Wisconsin River, of Galena formation chert. In return,

finished copper implements, some of which were utilized in a ortuary program, were received by the Osceola population. Notably, copper implements of Archaic age are extremely rare above the mouth of the Wisconsin River in the Upper Mississippi Valley.

Two other commodities known to occur in east-central and northeastern Wisconsin are less visible. Galena cubes have been reported in Red Ocher burials (Ritzenthaler and Neihoff 1958). They also occur sporadically as surface finds in the Lake Winnebago and Sheboygan Marsh localities (Ostberg, personal communication) but cannot be affiliated with any particular prehistoric culture. Gulf conch shell in unmodified form and as beads is known from several Archaic-Early Woodland mortuary contexts (Overstreet 1980).

While these items are rare in the archaeological literature, they are sufficiently common in private and museum collections. Considering the nature of the raw materials and their uses, the low frequencies are not surprizing. Galena, as Walthall (1981) indicates was likely utilized as a source of pigment, traces of which are almost nonexistent in the archaeological record. Gulf conch shell and shell beads while known from well drained mortuary localities from eastern Wisconsin would not likely be preserved in acid soils of less well drained localities. In spite of these limitations, shell and galena represent an additional commodity that could have entered eastern Wisconsin from the Osceola locality but which is missing from the archaeological record as a result of both natural and cultural agencies.

To the south galena from the Upper Mississippi Valley sources (Walthall 1981) and copper from the Lake Superior region (Cook 1976) have been noted. Cook states for the Titterington phase: "On stylistic grounds, the copper artifacts closely resemble contemporary Old Copper artifacts in Wisconsin (1976: 65)." For the subsequent Helton phase he notes the presence of both copper and galena:

> The mortuary sites provide the best view of the trade dimensions of the Helton phase. Items not locally available are found at Hemphill and Godar sites. The Hemphill inventory includes copper artifacts and a nugget, marine shell, flourspar, and galena (1976: 97).

Given then the abundant floodplain resources to support a stable population, immediate access to important trade commodities, proximity to the major communication system in the prehistoric midwestern United States, and an intermediate position relative to groups north and south, the Osceola residents from Archaic-Middle Woodland times likely played a critical role in the transmission of goods and ideas throughout the Upper Mississippi Valley.

Holocene Climate, The Potosi Terrace, and Cultural Contexts:

Holocene climatic changes have already been reviewed in this report, and, while there is often dissension among researchers of past climates, some general trends have been noted. We have cited Knox, McDowell, and Johnson's (1981) model which indicates cool/moist conditions from 10,000-7500 B.P., warm/dry from 7500-6000 B.P., and reversion to cool/moist from 6000 B.P. to present. These variations are derived from fluvial stratigraphy and differ somewhat from trends derived from pollen data.

Paleoclimatic maps constructed from fossil pollen data (Webb and Bryson 1972, Webb 1980, and Bartlein and Webb 1982) indicate a different scenario. Specific to the Driftless Area, Bartlein and Webb (1982) note concurrence to a cool/moist trend beginning about 6,000 B.P. for the Upper Mississippi Valley and surrounding regions. Yet they note an important disclaimer for the locality which encompasses the Grant River Public Use Area:

> From 6000 to 3000 B.P., precipitation increased around 10% nearly everywhere in the Midwest except from Iowa to northern Indiana. The decrease in precipitation along the southern edge of the region is matched by a similar adjustment in the distribution of prairie-forb pollen and is accompanied by a decrease in temperature across the northern half of the Midwest. These changes are probably related to an increase in the duration of Arctic airmasses in the north and a southward shift in the axis of the strongest westerlies. From 3000 B.P. to the present, precipitation increased across the southern edge of the region as the duration of the moist Atlantic (maritime Tropical) airmasses increased there (1982: 76).

On the Potosi Terrace, if the model derived from fluvial stratigraphy were followed, we would expect revegetation and greater surficial stability following the cool/moist reversion after 6000 B.P. By way of contrast, if one employs the Bartlein-Webb model, revegetation and stability of terrace surfaces along the Mississippi River would have occurred after 3000 B.P. In point of fact, the terrace at Potosi appears to have been characterized by relative instability throughout the entire prehistoric continuum at the Grant River Public Use Area. Consistent eolian reworking of surfaces persists at least up to and probably during Late Woodland times. Pedogenesis is retarded throughout the Holocene matrix and soil development commences following deposition of circa 20.0cm of eolian deposition on Late Woodland surfaces.

In part the instability may be a reflection of human activities on the terrace. However, excavation, reveals evidence of little activity aside from lithic reduction

tasks during the prehistoric eras. It is possible that Late Woodland populations may have prohibited stabilization via horticultural pursuits on the terrace but the evidence is nil at the Potosi locality. The possibility should not be entirely discounted as Theler cites evidence of Late Woodland cultigens at the Mill Pond Site in Crawford County (1983: 278-279).

Comparative data for terrace stability along the driftless Area reach of the Mississippi River are not at hand, and we unfortunately do not comprehend whether the Potosi Terrace is unique. Abbott and Tiffany (1982) have suggested that Late Wisconsinan terraces were suitable landforms for Late PaleoIndian occupation and:

> Occupations by later cultural groups also occurred on these terraces due to their usually well drained character and proximity to the Mississippi River. These components, if present, would be found stratified in the contruncated soils above the clays. Holocene accretion, the result of bioturbation, littering, and aerosol loessal additions has buried and incorporated into the soil profile the occupational surface and deposited cultural material of these cultural groups. These cultural components, if present, would be found stratified in undisturbed and untruncated soils above the clays of the IIB horizon (Abbott and Tiffany 1982).

This certainly is not the case at the Potosi Terrace and acceptance or rejection of that hypothesis must await additional study at the Potosi Terrace and others in the Tri-State region. With only the Grant River Public Use Area data as a point of departure, one could conclude that instability persisted very late in the Holocene, vegetation was consistently of the dry prairie-scrub type, plant and animal resources were minimal, and such topographic features were not preferred habitation areas. Dry prairie and scrub vegetation persisted into historic times as the reconstruction in Figure 4 indicates. Upland adaptation, whatever that term represents, seems inappropriate throughout the Archaic and Woodland traditions at this locality. Finally, following these assumptions, the interpretation that mid-late Holocene climate is the causal factor for instability and not the human activities documented on the Potosi Terrace is preferred, the absence of quantifiable data notwithstanding.

Subsistence and Settlement - A view from the Potosi Terrace:

Subsistence and settlement data from the Potosi Terrace, with the exception of the previously excavated data from the Hog Hollow locality are sparse. This comes as a

distinct surprize in view of contemporary models that indicate such topographic settings represent localities where substantial habitations should be situated. For many of the known prehistoric cultures of this region, we expect the archaeological record to indicate intensive domestic activities on Mississippi River terraces.

In a recent overview of prehistoric lifestyles, Stoltman (1983) has summarized each of the major traditions from an exhaustive review of the literature and from his own investigations in southwestern Wisconsin. With regard to Early Archaic horizon markers he notes:

> The vast preponderance of them have been found south of the northern border of Illinois where they occur mainly in upland settings. A few have been found in the Mississippi Alluvial valley, but these occurrences are so rare (Luchterhand 1970: 33-36) that it must be assumed intensive exploitation of floodplain resources had not yet begun (1983: 210)

Of the "Old Copper Complex" he indicates:

> Our recent research in the low floodplain of the Prairie du Chien area has recovered a few Osceola points, the oldest artifacts presently known to us in this habitat, but no evidence yet of an intensive exploitation of the floodplain at this time. It appears that the Old Copper people were primarily upland-adapted hunters and fishers who are nontheless likely candidates for initiators of the process of more intensive utilization of the floodplain resources in the more northern segments of the upper Mississippi Valley region (1983: 215).

By Woodland times, Stoltman depicts floodplain utilization as intensive:

> If the trend toward increasingly intensive exploitation of Mississippi floodplain resources can be seen unfolding from Helton times to the time of the Marion Culture, a climax of sorts was attained during the Black Sand Culture, circa 400-100 B.C., with persistence in marginal areas until circa A.D. 100 (1983: 225).

For Middle and Late Woodland (Stoltman 1983, Theler 1983), articulation with floodplain environments is noted, with the intimation that terrace environs and upland habitats were preferred with only seasonal exploitation of the Mississippi River floodplain.

If these models are correct, we would expect minor exploitation of floodplain resources beginning in Late Archaic times, reaching their "climax" at the transition

from Early to Middle Woodland eras, and then becoming less intensive during the so-called Hopewell flouresence through Late Woodland times.

As an alternative, based on data from navigation Pools 10, 11, and 12 (Boszhardt and Overstreet 1982, Overstreet, 1983, Overstreet 1984, Overstreet n.d.) a less complex model is suggested. Beginning in Middle Archaic times, with the Osceola/Hog Hollow locality as the point of reference, intensive exploitation of lowland floodplain resources was established. Settlements, rather than in uplands, were situated immediately proximate to those resources--on the floodplain. This intensive articulation with the river bottom habitat was maintained throughout the prehistoric continuum until depopulation in Late Woodland times. There is an apparent hiatus during proto-historic, early historic, and middle historic times. This is based on the narrative of Marquette (1900) who found the locality vacant in the 17th century. Re-occupation and control by the Fox Sauk apparently did not occur until the 18th century, by which time emphases were placed on lead resources, and, at a time when traditional subsistence and settlement patterns had already been disrupted by participation in the fur trade.

The reasoning here is based much on the lack of hard evidence, but is intended as a means of focusing on existing data biases. Recent archaeological surveys on the lowland floodplains of Navigation Pools 10, 11, and 12 have identified a significant number of archaeological sites in lowland floodplain contexts (Boszhardt and Overstreet 1982, Stoltman et al 1982, Overstreet 1984, Boszhardt 1982). Many of these sites are buried by significant amounts of Holocene alluvium. Unfortunately, only a few of these known sites have been subjected to excavation.

On the basis of excavation of shell midden sites in the Pool 10 locality, Theler (1983) has noted the importance of that floodplain resource and has provided a model of Woodland tradition economic strategies. Overstreet (1984) has identified shell middens and cultural materials through means of remote sensing, soil coring, bucket auger investigations, and very limited test excavations at depths of 4-15' below the present surface. Church (1984) has summarized geomorphic processes that explain the phenomenon of site burial in much of the Upper Mississippi Valley. From these endeavors, it is possible to identify significant biases in the extant data that have strong implications for understanding floodplain adaptive strategies throughout much of the Holocene. First, as noted in Overstreet (1984) few investigations have focused on land surfaces that pre-date 300 B.C. Second, investigations conducted by Theler (1983) have focused on fresh water mussel extraction and processing sites and have not included residential or other functionally specific sites.

This in not an indictment of the research cited. Rather, the intent is to provide a basis for evaluating the present limitations of floodplain archaeology. The major

problems are logistical. Occupied surfaces that pre-date Woodland times are known to exist, buried by 15 or more feet of sediment. Often these surfaces are 6 or more feet below the present water table. The prospect of dewatering and placing protective devices such as shoring and bulkheads is a deterent to archaeological investigation. Finally, the distinctions between the current floodplain with its soggy sediments and thick noxious vegetation and those of the middle to late Holocene are not well understood. The nature of these earlier environments, now hidden by the agrading floodplain, will not be revealed until deep site excavations are conducted. Alluvial filling of the Upper Mississippi Valley, accelerated during historic times has masked earlier floodplain topography, made it very difficult to identify and evaluate pre-Woodland deposits, and resulted in a biased view of prehistoric utilization of the Mississippi River floodplain. Investigations of the terrace and inundated margins of the Grant River floodplain have provided an additional example to support the hypothesis that the floodplain and not the terraces and uplands was the focus of prehistoric habitation.

Executive Summary/Research Evaluation:

As outlined in the proposal to conducted these investigations, (refer to Appendix A) recovery of significant data and means to protect the remainder of the Grant River Public Use Area archaeological resources have been realized. The utilization of combined techniques of remote sensing, auger investigations, and archaeological investigation, along with intensive archival research and collection of oral histories has had positive results. First, the site formation processes of the Potosi Terrace have been identified and reported in a detailed manner. This, in turn has allowed for a valid assessment of archaeological deposits at the Grant River Public Use Area. As well, these investigations have provided for a re-evaluation of previous excavations at the Osceola and Hog Hollow Sites where site formation processes were not considered or were misunderstood. Of additional importance is the assessment of Holocene climate on the land surfaces of the Potosi Terrace. It is not known whether the Potosi Terrace is unique. However, the processes explicated at the grant River Public Use Area will be of use for investigations of other terraces adjacent to the Mississippi River in this locality.

Inability to recover habitation data is viewed as a result of the absence of such information at the recreation area, and subsequently, it is suggested that such topographic features were not suitable for habitation when contrasted with adjacent floodplain environs. The development and maintenance of recreational facilities will have no significant effect on remaining archaeological deposits if the following management plan is implemented.

Grant River Public Use Area Cultural Resource Management Plan:

The Grant River Public Use Area harbors archaeological deposits of considerable antiquity. The earliest occupants of the region date to approximately 7,000-8,000 B.C. During the Middle to Late Holocene, utilization appears to have been more enduring than in earlier times. Additionally, major occupation is not in evidence subsequent to Late Woodland eras, approximately 1,000 A.D. The locality is well known in regional and national literature, primarily as the type site for the "Old Copper" culture and as a source of galena during prehistoric and historic times. Local chert resources were also of regional importance during prehistoric times. The locality was also the site of Osceola Landing, one of several important incipient commercial centers associated with steamboat traffic during the mid-19th century. Like many other river settlements, Osceola landing was abandoned during the cholera epidemics and never resettled.

Local interest in the history and prehistory of the Grant River Public Use Area is very high. Local informants, area research centers, museums, libraries, and local historical societies currently house both records and artifacts from the site. The significance of the site has already been established through the securing of a determination of eligibility for the National Register of Historic Places. In addition to those factors already noted in that determination, the Grant River Public Use Area is important as an exchange hub of economic commodities throughout its occupational history. These include: (1) copper; (2) cherts derived from the lower Galena formation; and (3) galena cubes. In addition, the site is important to understanding the combined effects of Holocene climate and man's activities on the terrace landscape at Potosi. Currently, the site archaeological deposits are not threatened. However, future management considerations may pose minor problems.

Future Cultural Resources Management:

Several localities have been delineated that contain buried archaeological deposits. These deposits will not likely be threatened by future recreation area maintenance and public use for several reasons. First, the archaeological deposits are, for the most part, buried by 30.0cm of wind blown material. As long as vegetation cover is maintained on the site it is unlikely that deflation will again begin. Second, the locations of archaeological deposits are not coincident with intensive use at the campground or other recreation area facilities. It may be of use to post notices and prohibit any digging on the site by visitors although this may not be necessary as a full-time caretaker is planned for the recreation area. Finally, with the

exception of the Hog Hollow locality, shoreline erosion has been abated by placement of rip-rap. At the Hog Hollow locality, the feasibility of shoreline protection should be considered as shoreline destruction is significant. Additional archaeological deposits are known to exist at Hog Hollow.

Areas of high archaeological potential have been delineated for the recreation area. Combined methods of ground penetrating radar and resistivity survey, core and auger transects, and scattered excavations have resulted in a firm understanding of the horizontal and vertical distribution of cultural materials. Should future earth disturbing activities be planned at the recreation area, the existing data will serve as a well defined guide to mitigation. Mitigation is recommended only within the boundaries of significant localities. Finally, given the context of preservation of archaeological deposits at the Grant River Public Use Area, surficial facilities, those that cause no disturbance greater than 20.0cm in depth, will have no significant impact on cultural resources. Any anticipated undertakings in significant archaeological areas that will disturb the surface beyond a depth of 20.0cm should be subjected to archaeological excavation. However, it seems likely that sufficient area of low potential exists at the recreation area for siting new facilities and excavation would occur only in unusual circumstances.

Interpretive Potential:

Few sites along the Mississippi River in federal ownership have greater interpretive potential than the Grant River Public Use Area. Visitor numbers are high, and will likely increase with the establishment of new facilities. As on-site staffing is planned, the development of an interpretive exhibit has even greater feasibility. Given that interpretation is an important aspect of any cultural resources managements program, the following themes are identified for potential interpretive purposes.

1. Prehistoric culture history: Utilizing artifacts, maps, and photographs, the culture history of the Potosi Terrace should be summarized.

2. Historical importance of the region: Two primary historic themes, lead mining and steamboat traffic, and their impact on development of the region should be interpreted. Again, exhibits should integrate artifacts, historical maps, early narratives, and photographs.

3. Landscape Evolution: The Potosi Terrace has been relatively unstable throughout most of the Holocene. The landscape has responded to climatic shifts and, to an unknown degree to man's activities. In more recent

times, the effect of man's activities, for example, the construction of the 9' navigation channel, have been more compelling than those of climate. Through the use of geomorphic/geological data and historical maps, changes in the landscape should be identified.

The following represent milestones in the culture-history of the grant River Public Use Area.

1. Formation of the Potosi Terrace during catastrophic floods-pre-12,000 B.P.

2. Alternate scouring and deposition during periods of glacial meltwaters-terminated by 9,500 B.P.

3. First evidence of human presence on the Potosi Terrace-9,000 B.P.

4. Onset of dry-warm climate, instability of soils and vegetation-Mid Holocene 9700-4700 B.P.

5. Appearance of "Old Copper" people (Helton and Tittering-ton Phases)-mortuary context-7,000-5,000 B.P.

6. Appearance of Woodland people-Early, Middle, and Late Woodland occupation-2,500-1,000 B.P.

7. Abandonment - 1,000 B.P.

8. European Discovery of the Mississippi-Marquette & Joliet 1673.

9. Fox-Sauk control- Mid-1700's.

10. Indian lead mining (Julian Dubuque - 1788.

11. Military Expeditions (Pike and Long) 1805, 1817.

12. The Lead Mining Frontier - 1820's.

13. Agriculture & Trade 1830's.

14. The Cholera epidemic and ghost towns 1840's.

15. The Railroads 1860's.

16. Lumbering & Rafting 1870's-1890's.

17. Clamming & the Pearl Button Industry-1890-1930.

18. Construction of the locks & Dams 1940's.

Virtually all of these themes and milestones could realistically be interpreted from the perspective of the Grant River Public Use Area providing visitors with a compre-

hensive geologic and culture history of this reach of the Mississippi River. Many of the maps and artifacts necessary for such an interpretive exhibit are already in government ownership. Others not available such as "Old Copper" specimens could be easily replicated. Photographs and archives are available in area museums and other repositories. In conclusion, in view of the shift to fee-status of the recreation area and improved facilities coincident with a locality of exceedingly rich and varied history and prehistory, interpretation opportunities are ample indeed.

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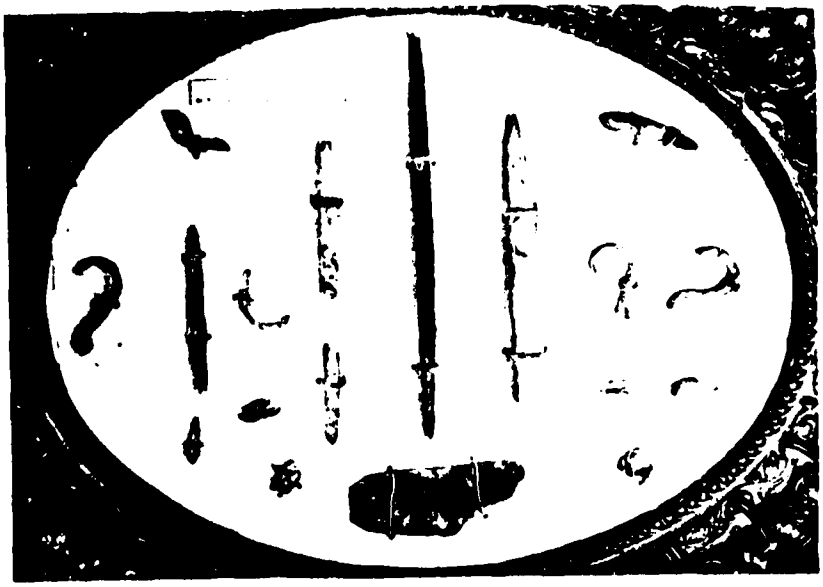
Key to Plate I:

A. Copper awls, waste lumps, hooks (decorative?), clasp beads, and fragment of a wedge shaped celt(?). John Woolf collection from Osceola Site (47 Gt 24), materials previously unreported.

B. Copper spuds in collections of the Rollo Jameison museum, Platteville, Wisconsin. Previously the collection of Rollo Jameison, Beetown, Wisconsin, from the Osceola Site (47 Gt 24), previously unreported.

C. Reverse of B.



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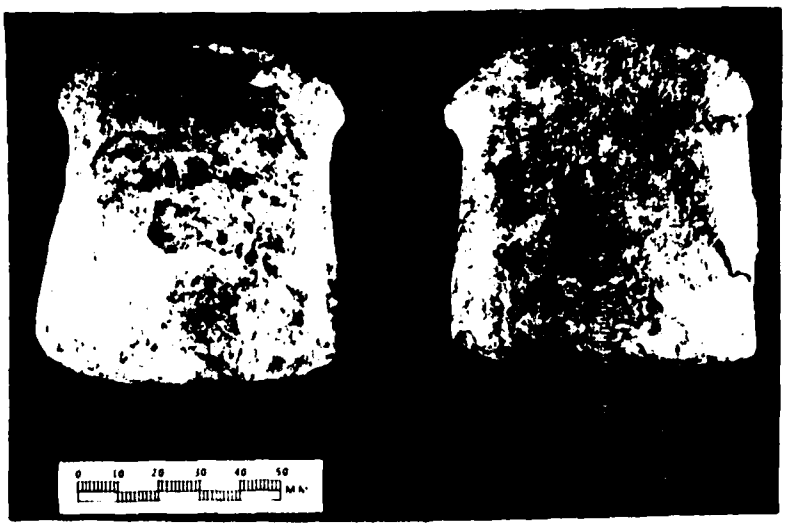

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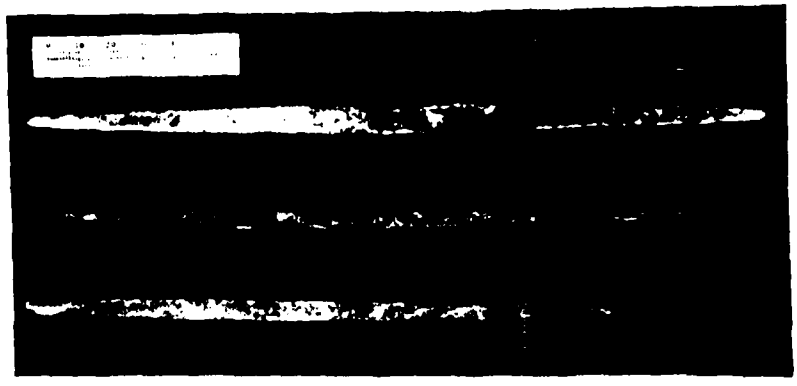

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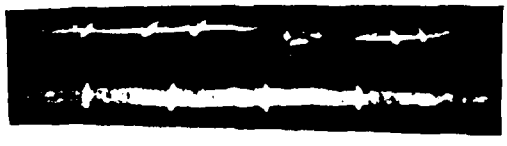

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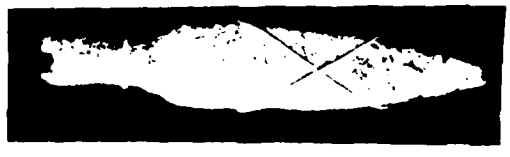

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PLATE II

Key to Plate III:

A. Awls, Ed Goke Collection, Osceola Site (47 Gt 24), reported by Ritzenthaler (1946).

B. Awls, Ed Goke Collection, Osceola Site (47 Gt 24), reported by Ritzenthaler (1946).

C. Awls, Ed Goke Collection, Osceola Site (47 Gt 24), some materials excavated by Ritzenthaler, reported by Ritzenthaler (1946).

D. Awls, Ed Goke Collections, Osceola Site (47 Gt 24), some materials excavated by Ritzenthaler, reported by Ritzenthaler (1946).

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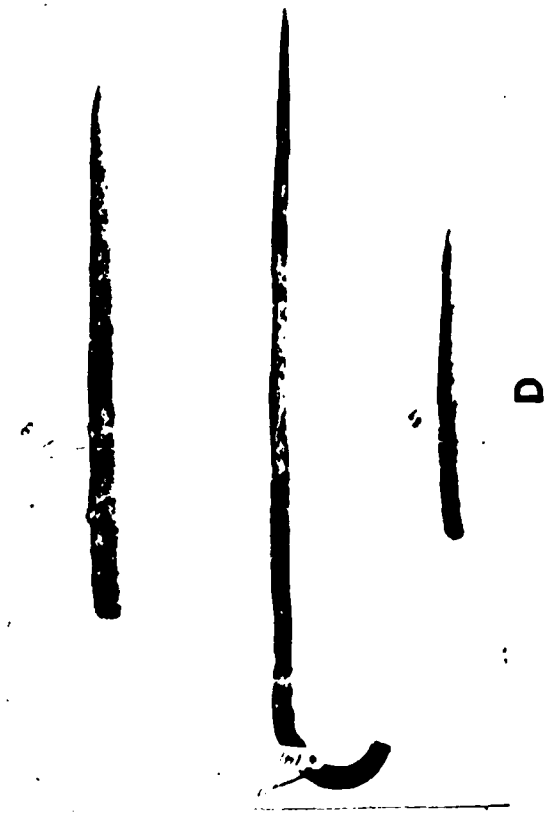

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PLATE III

Key to Plate IV:

A. Copper Spuds, Ed Goke Collection, reported by Ritzenthaler (1946). Osceola Site (47 Gt 24).

B. Copper waste, tanged knife, and awls, Ed Goke Collection, reported by Ritzenthaler (1946).(47 Gt 24).

C. Ed Goke Collection, rolled bead and decorative (?) implements, Osceola Site (47 Gt 24), reported by Ritzenthaler (1946).

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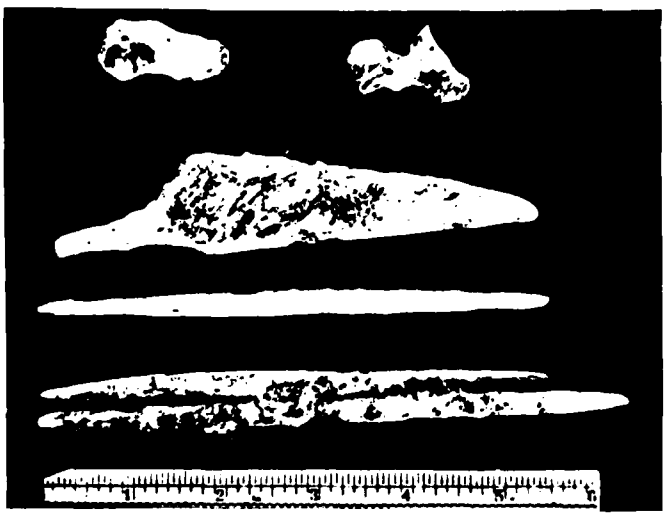

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PLATE IV

Key to Plate V:

A. Raddatz-Osceola Points, Osceola Site (47 Gt 24), Richard Audetat Collection (see also Figure 14)

B. Osceola-Godar Points, Osceola Site (47 Gt 24), Richard Audetat Collection (see also Figure 14).

C. Osceola Points, Osceola Site (47 Gt 24), Richard Audetat Collection (see also Figure 14).

D. Side-notched and contracting stemmed point, Osceola Site (47 Gt 24), and preform, Rollo Jameison Museum, Platteville, Wisconsin, from Rollo Jameison Collection.

A

B

C

D

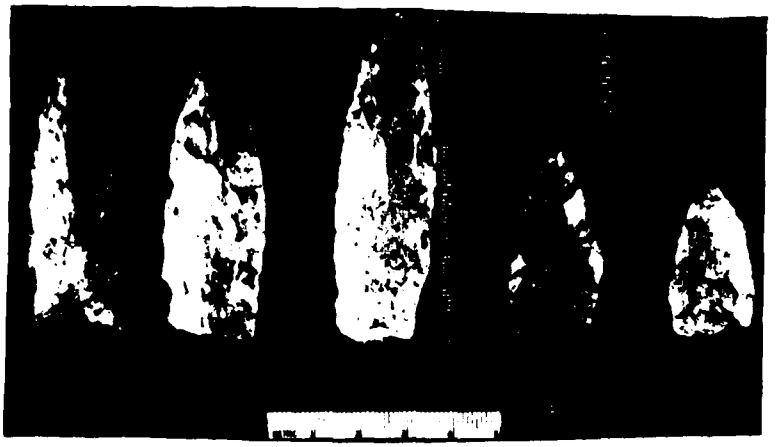
PLATE V

Key to Plate VI:

A. Stemmed points and knives, Osceola Site (47 Gt 24) Clauaer Collection, courtesy of Mr. Richard Audetat, Bloomington, Wisconsin.

B. Contracting stemmed points, Potosi Terrace, Mr. Joseph Doser Collection, Potosi, Wisconsin.

C. Side-notched and stemmed points, Osceola Site (47 Gt 24), Clauaer Collection, courtesy of Mr. Richard Audetat, Bloomington, Wisconsin.



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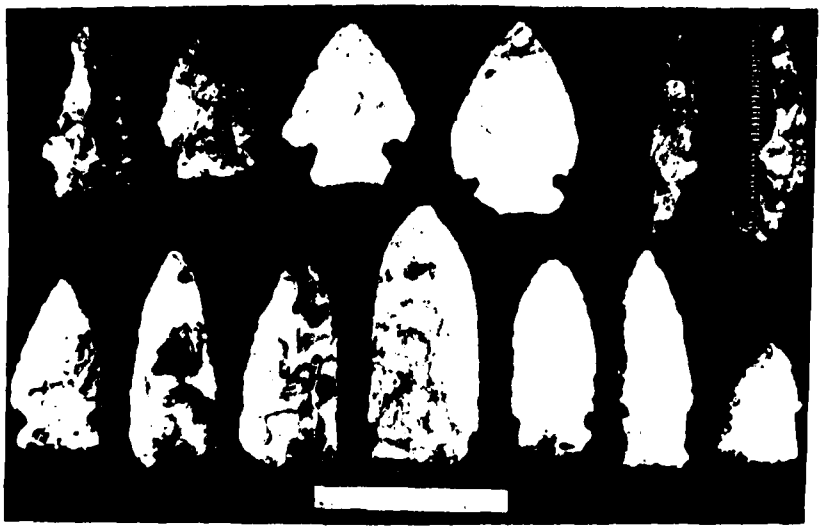

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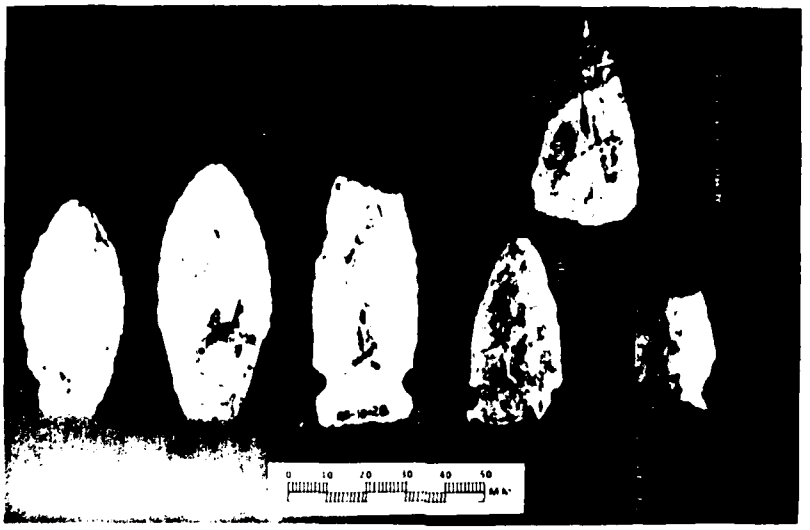
PLATE VI

Key to Plate VII:

A. Kopp Collections (provenience non-specific), courtesy of Rollo Jameison Museum, Platteville, Wisconsin.

B. Leo Winkler Collection, stemmed and notched points, Osceola Site (47 Gt 24), courtesy of Mr. Don Winkler.

C. Philip Ames Collection, Potosi Terrace.



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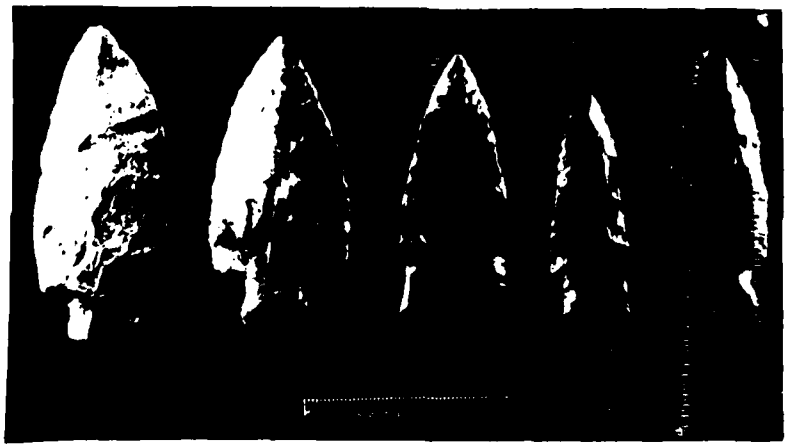

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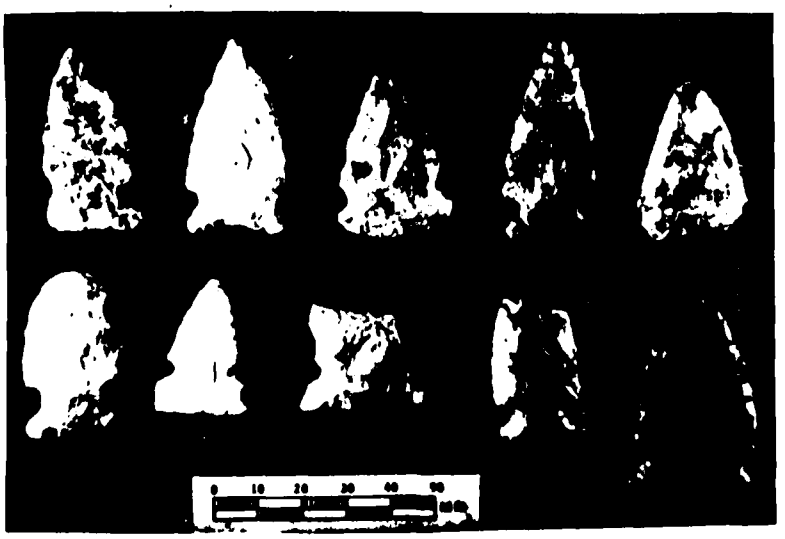

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PLATE VII

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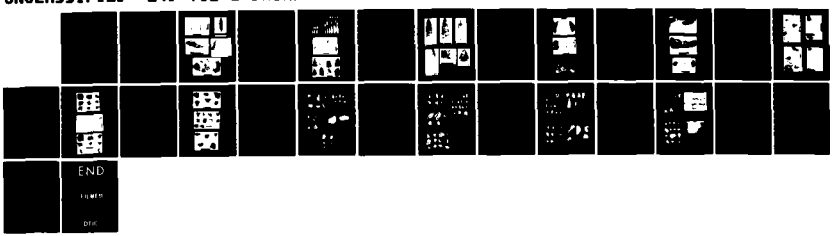

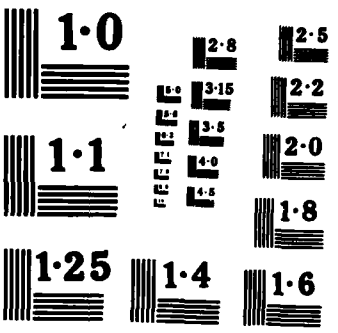
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Key to Plate VIII:

A. Lanceolate projectile points, Potosi Terrace, Ed Goke Collection, courtesy of Mr. John Woolf, Potosi, Wisconsin.

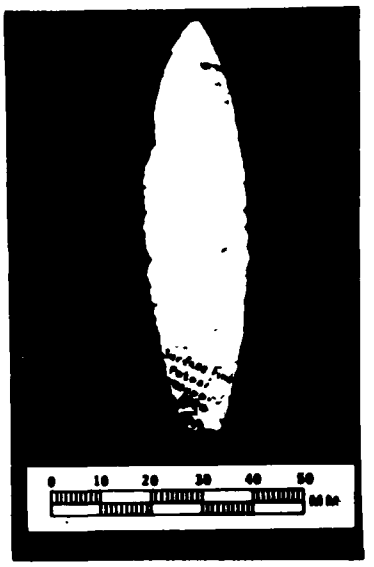
B. Lanceolate projectile point, Potosi Terrace, immediately east of Osceola Site (47 Gt 24), courtesy of Mr. Harris Palmer, Platteville, Wisconsin.

C. Lanceolate projectile point, Potosi Terrace, Joseph Doser Collection, Potosi, Wisconsin.

D. Ovate preforms from Osceola Site (47 Gt 24), Leo Winkler collection, courtesy of Mr. Donald Winkler, Lancaster, Wisconsin.

E. Large ovate preform, Osceola Site (47 Gt 24), courtesy of Mr. Richard Audetat, Bloomington, Wisconsin. Clauaer collection.

A



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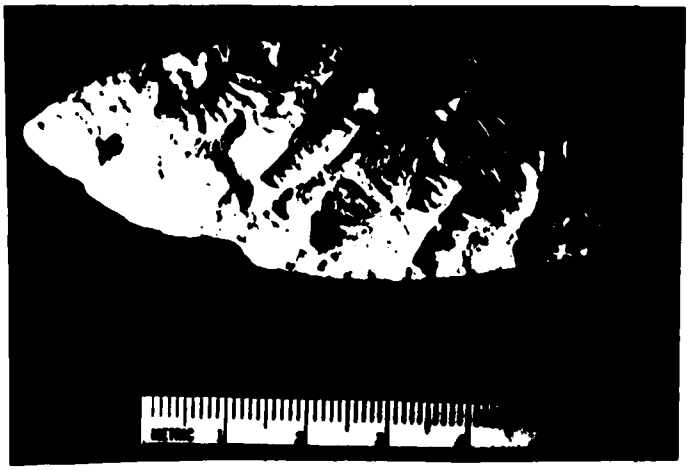
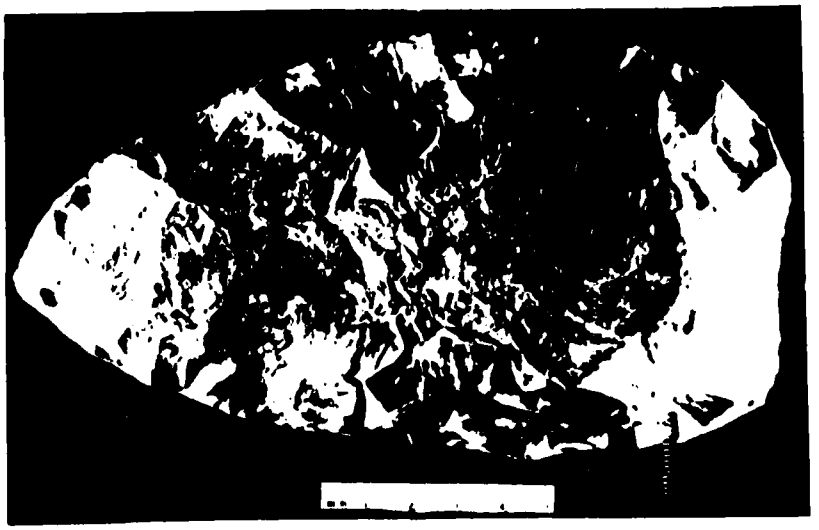


C

D



E

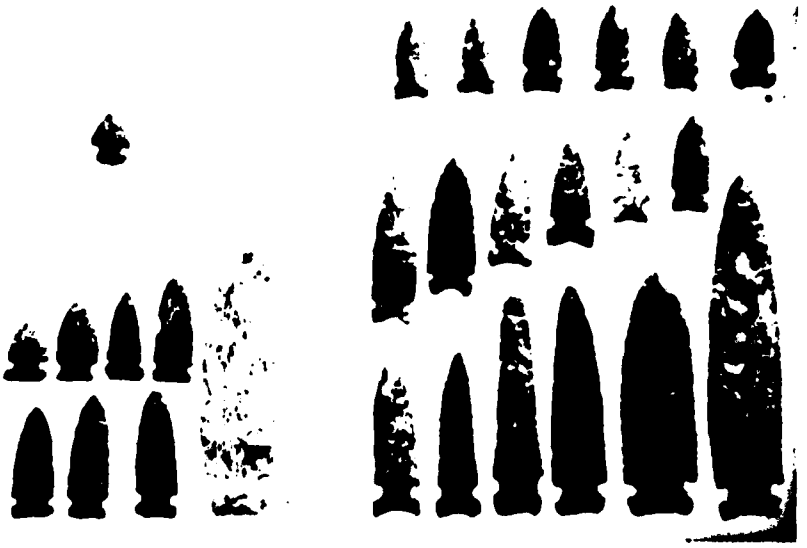
PLATE VIII

Key to Plate IX:

A. Original type collection, Osceola Side Notched, Goke Collection, reported by Ritzenthaler (1946), courtesy of Mr. John Woolf, Potosi, Wisconsin.

B. Notched and stemmed projectile points, Osceola Site (47 Gt 24), Leo Winkler Collection, courtesy of Mrs. Spence Kuster, Potosi, Wisconsin.

C. Preforms and crude bifaces from Osceola Site (47 Gt 24), Kaltenbach Collection, courtesy of Kaltenbach family, Potosi, Wisconsin.



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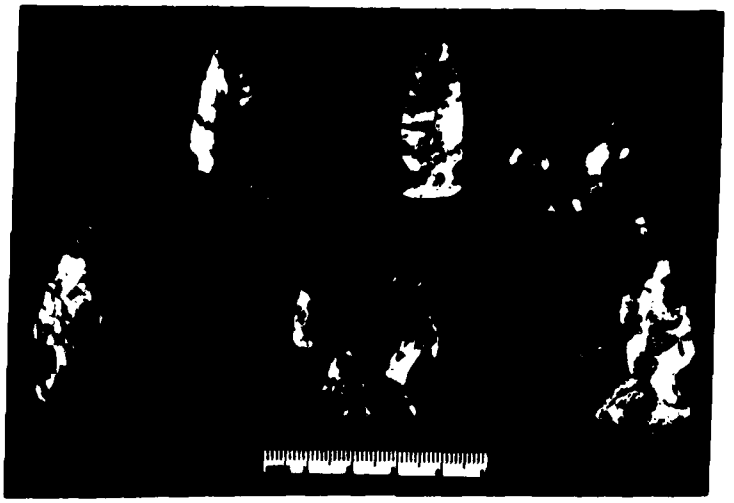


B

C

PLATE IX

Key to Plate X:

A-C. Large side-notched points (A & C reconstructed with bases added), Ed Goke Collection, Osceola Site (47 Gt 24), courtesy of John Woolf, Potosi, Wisconsin.

D. St. Charles (Dove-tailed) point, Osceola Site (47 Gt 24), Leo Winkler Collection, courtesy of Don Winkler, Lancaster, Wisconsin.

E. Hardin Barbed Point, Joseph Doser Collection, Potosi Terrace.

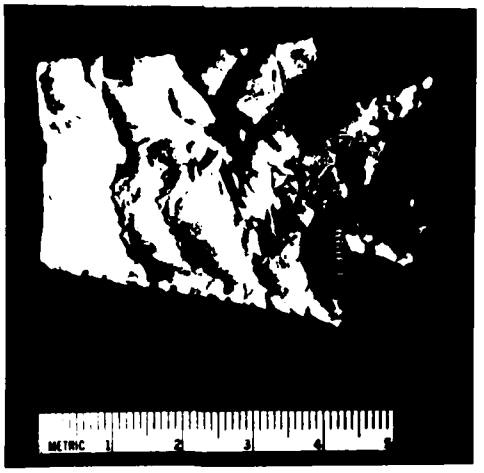
F. Thebes-like projectile point, Osceola Site (47 Gt 24), Leo Winkler Collection, courtesy of Don Winkler, Lancaster, Wisconsin.

A

B

C

D



E

F

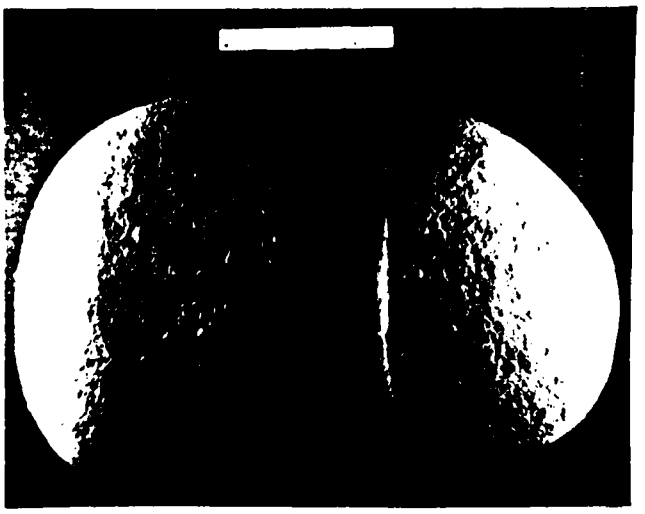
PLATE X

Key to Plate XI:

A. Grooved Axe, Joseph Doser Collection, Potosi Terrace.

B. Grooved Axes, Osceola Site (47 Gt 24), Clauaer Collection, courtesy of Mr. Richard Audetat.

C. Bannerstone from Osceola Site (47 Gt 24), Ed Goke Collection, courtesy of John Woolf, Potosi, Wisconsin. Reported by Ritzenthaler (1946).



A

B

C

PLATE XI

Key to Plate XII:

A. Celt from Osecola Site (47 Gt 24), Leo Winkler collection, courtesy of Mr. Don Winkler, Lancaster, Wisconsin.

B. Celt stained with galena, Joseph Doser Collection, Potosi Terrace.

C. Celt from Osceola Site (47 Gt 24), Skaite Collection, courtesy of Mr. Richard Audetat.

A

B

C

PLATE XII

Key to Plate XIII:

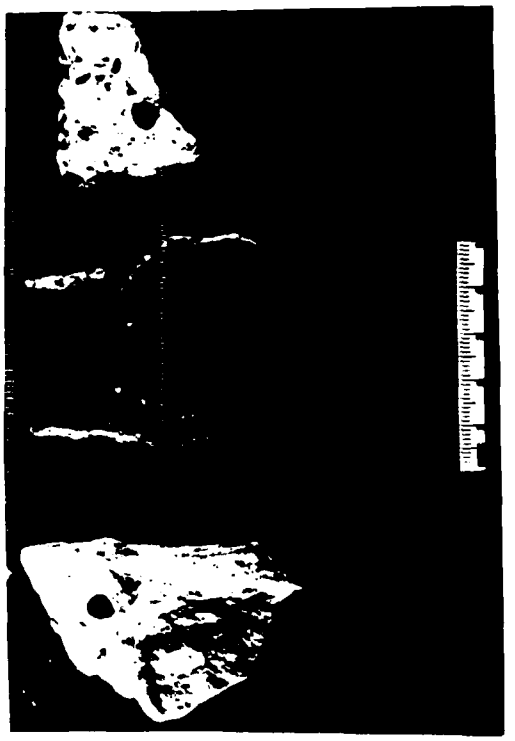
A. Sister's Creek Punctated vessel from Potosi Terrace, Skaite Collection, courtesy of Mr. Richard Audetat.

B. Interior of A.

C. Prairie Phase ceramics, Osceola Site (47 Gt 24), Skaite collection, courtesy of Mr. Richard Audetat.

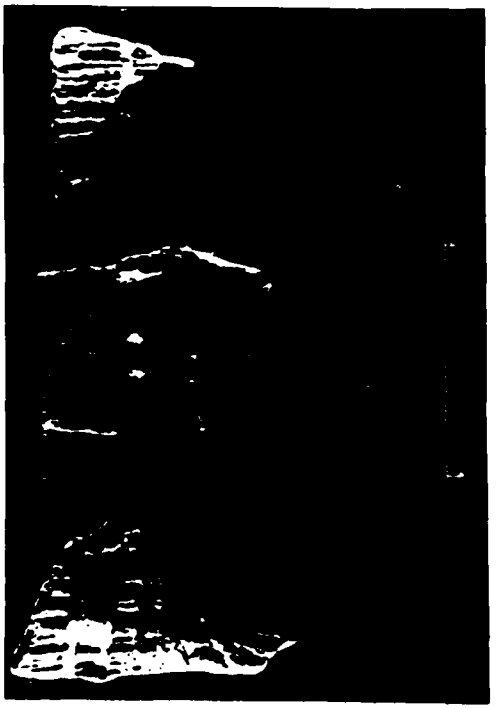
D. Interior of C.

B



D

A



C

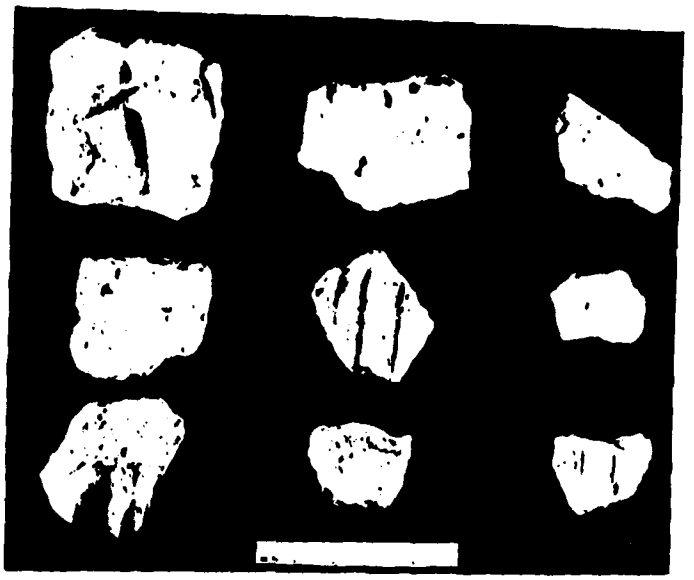
PLATE XIII

Key to Plate XIV:

A. Oneota ceramics (tool trailed, shell tempered) from Osceola Site (47 Gt 24), Richard Audetat collection.

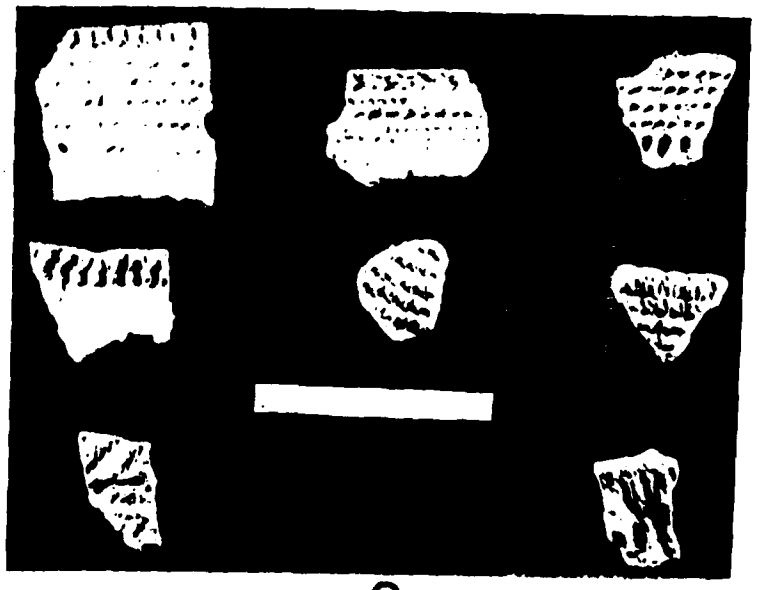
B. Woodland sherds from Potosi Terrace, Joseph Doser, Potosi, Wisconsin.

C. Late Woodland ceramics from Osceola Site (47 Gt 24), Richard Audetat collection (see also Figure 14).



A

B



C

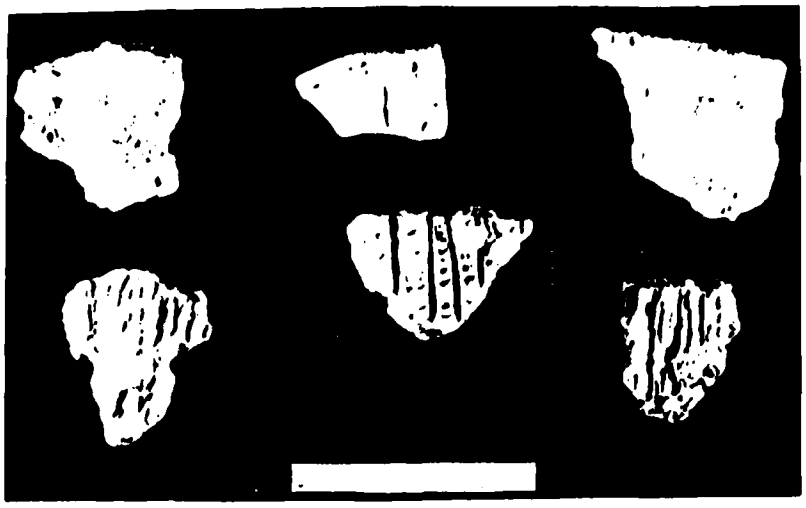
PLATE XIV

Key to Plate XV:

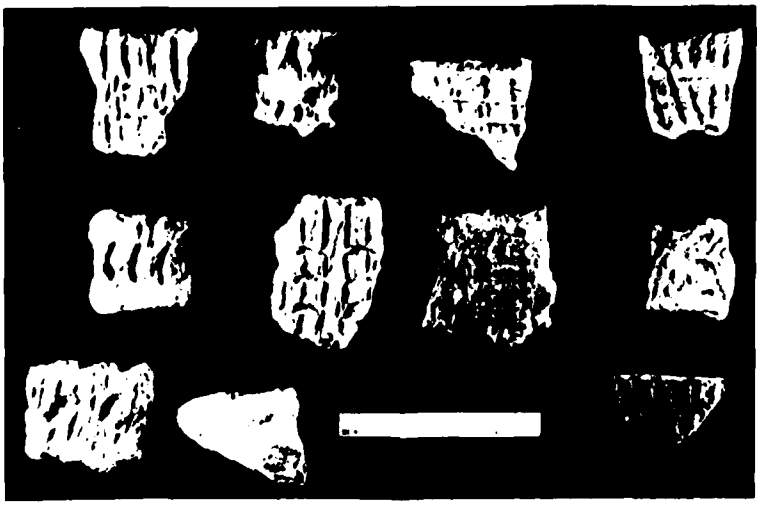
A. Early and Middle Woodland Ceramics, Osceola Site (47 Gt 24), Richard Audetat collection.

B. Prairie Phase ceramics, Osceola Site (47 Gt 24), Richard Audetat collection.

C. Dentate Stamped ceramics, Osceola Site (47 Gt 24), Richard Audetat collection.



A



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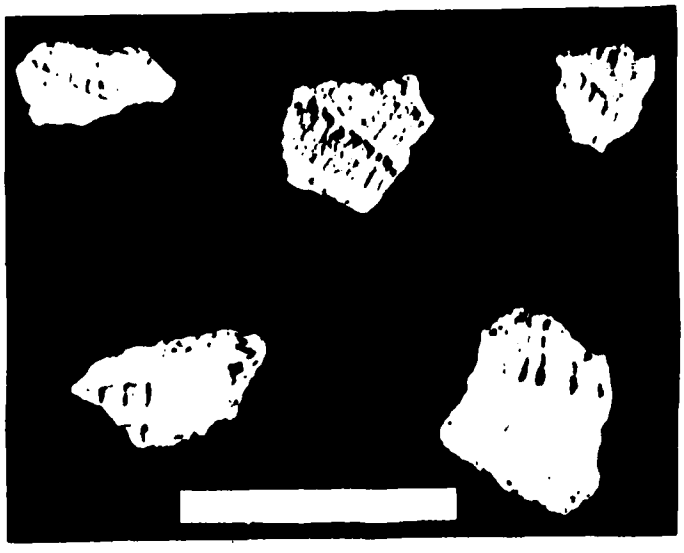


C

PLATE XV

Key to Plate XVI:

A. Cores, Area A, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 10, L4, Unit 2, L3, Unit 2, L3, Unit 8, L6, Unit 2, L2, Unit 2, L3.

B. Projectile points, bifaces, flake drill, and Late Woodland Ceramics, Area A, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 23, L5, Unit 10, L2, Unit 8, L6, Unit 10, L2, Unit 8-10 (Feat. 3), L3, Unit 8, L1.

C. Bifaces, Area A, Osceola Site (47 Gt 24).

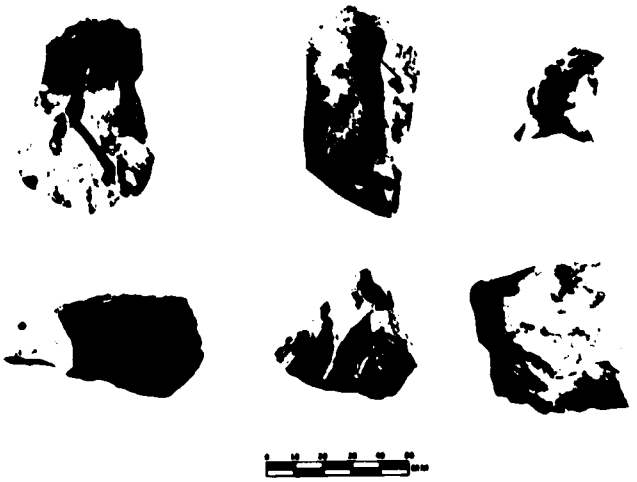
Provenience: L-R; Unit 8, L5, Unit 2, L2, Unit 4, L7, Unit 8-10 (Feat. 3), L3, Unit 2, L2, Unit 2, L3, Unit 2, L3, Unit 2, L3.

D. Chert in pyrite matrix from lower Galena formation, Area A, Osceola Site (47 Gt 24).

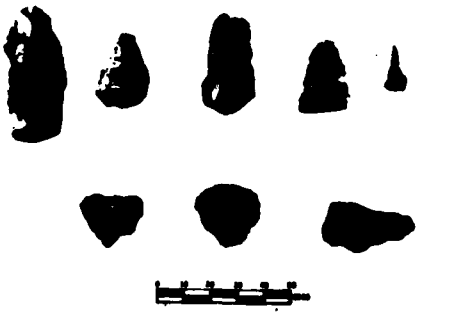
Provenience: Unit 10, L4.

E. Area C, Prairie Phase ceramics, Osceola Site (47 Gt 24).

Provenience: Unit 20, L5.



A



B

C

D

E

PLATE XVI

Key to Plate XVII:

A. Expended Cores, Area D, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 8, L4, Unit 28, L4, Unit 28, L4, Unit 28, L4, Unit 28, L4, Unit 18, L2.

B. Projectile Points, Drills, Broken bifaces, Utilized flakes, Middle Woodland sherd, Area D, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 17, L3, Unit 17, L7, Unit 28, L9, Unit 14, L3, Unit 28, L4, Unit 28, L4, Unit 28, L4, Unit 17, L8, Unit 28, L5, Unit 28, L4, Unit 28, L4, Unit 28, L7, Unit 18, L6, Unit 17, L5, Unit 17, L4, Unit 28, L5, Unit 28, L5, Unit 28, L4, Unit 17, L4, Unit 28, L5.

C. Cores, Area D, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 18, L8, Unit 17, L7, Unit 17, L7, Unit 28, L5, Unit 17, L6, Unit 18, L7.

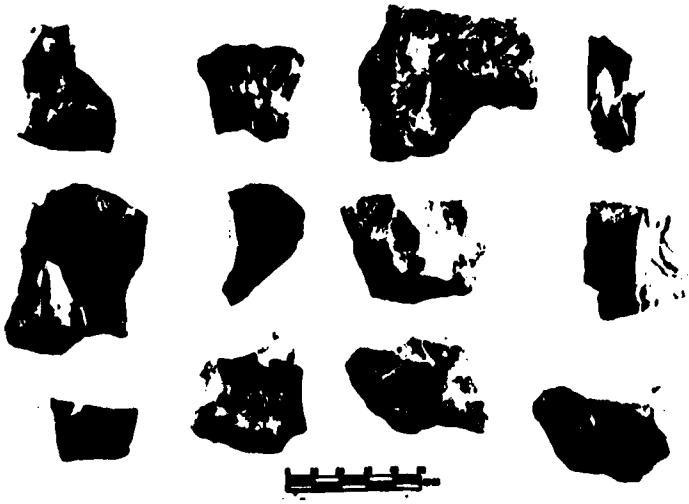
D. Chert Concentration, Area D, Osceola Site (47 Gt 24)

Provenience: Unit 17, L5.

A

B

C



D

PLATE XVII

Key to Plate XVIII:

A. Projectile Points, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 1, Unit 12, L3, Unit 12, L2, Unit 13, L7, Unit 9, L2, Unit 13, L5, Unit 16, L7, Unit 13, L8, Unit 16, L6, Unit 15, L5, Unit 13, L7, Unit 9, L12, Unit 25, L5, Unit 16, L9, Unit 13, L10.

B. Ad Hoc Tools, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 15, L8, Unit 15, L7, Unit 11, Unit 16, L2, Unit 12, L9, Unit 1, L6, Unit 1, L2.

C. Broken Points and bifaces, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 16, L8, Unit 14, L2, Unit 14, L9, Unit 1, L9, Unit 11, L4, Unit 13, L3, Unit 9, L3, Unit 9, L6, Unit 11, L3, Unit 9, L9, Unit 1, L3, Unit 12, L3.

D. Hammerstones, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 9, L10, Unit 9, L10, Unit 16, L8, Unit 15, L11, Unit 13, L10.

A

B

C

D

PLATE XVIII

Key to Plate XIX:

A. Crude Bifaces, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 2, L1, Unit 15, L3, Unit 7, L8, Unit 15, L7, Unit 9, L2, Unit 7, L6, Unit 9, L4, Unit 11, L14-15, Unit 16, L12, Unit 12, L4, Unit 14, L5, Unit 12, L5.

B. Cores, Area G, Osceola Site (47 Gt 24).

Provenience: L-R; Unit 15, L8, Unit 9, L15, Unit 12, 12, Unit 14, L9, Unit 1, L11-12, Unit 16, L6, Unit 14, L6, Unit 9, L12, Unit 1, L11-12, Unit 13, L10.

C. Kaolin Pipe and Woodland Ceramics from Area G (47 Gt 24).

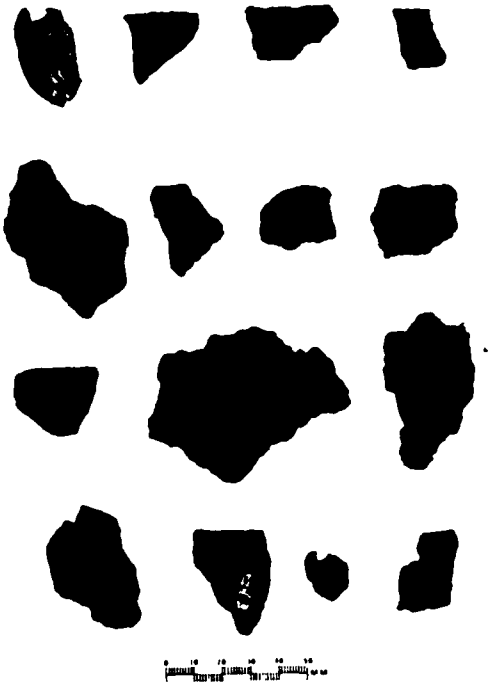
Provenience: L-R; Unit 12, L4, Unit 13, L5, Unit 13, L6, Unit 13, L5, Unit 9, L8, Unit 14, L9, Unit 15, L7, Unit 13, L6, Unit 12, L4, Unit 7, L6, Unit 13, L8, Unit 9, L6, Unit 14, L9, Unit 14, L9.

D. Late Woodland Vessel portion of Area G, Osceola Site (47 Gt 24).

Provenience: Unit 16, L4.

A

B



C

D

PLATE XIX

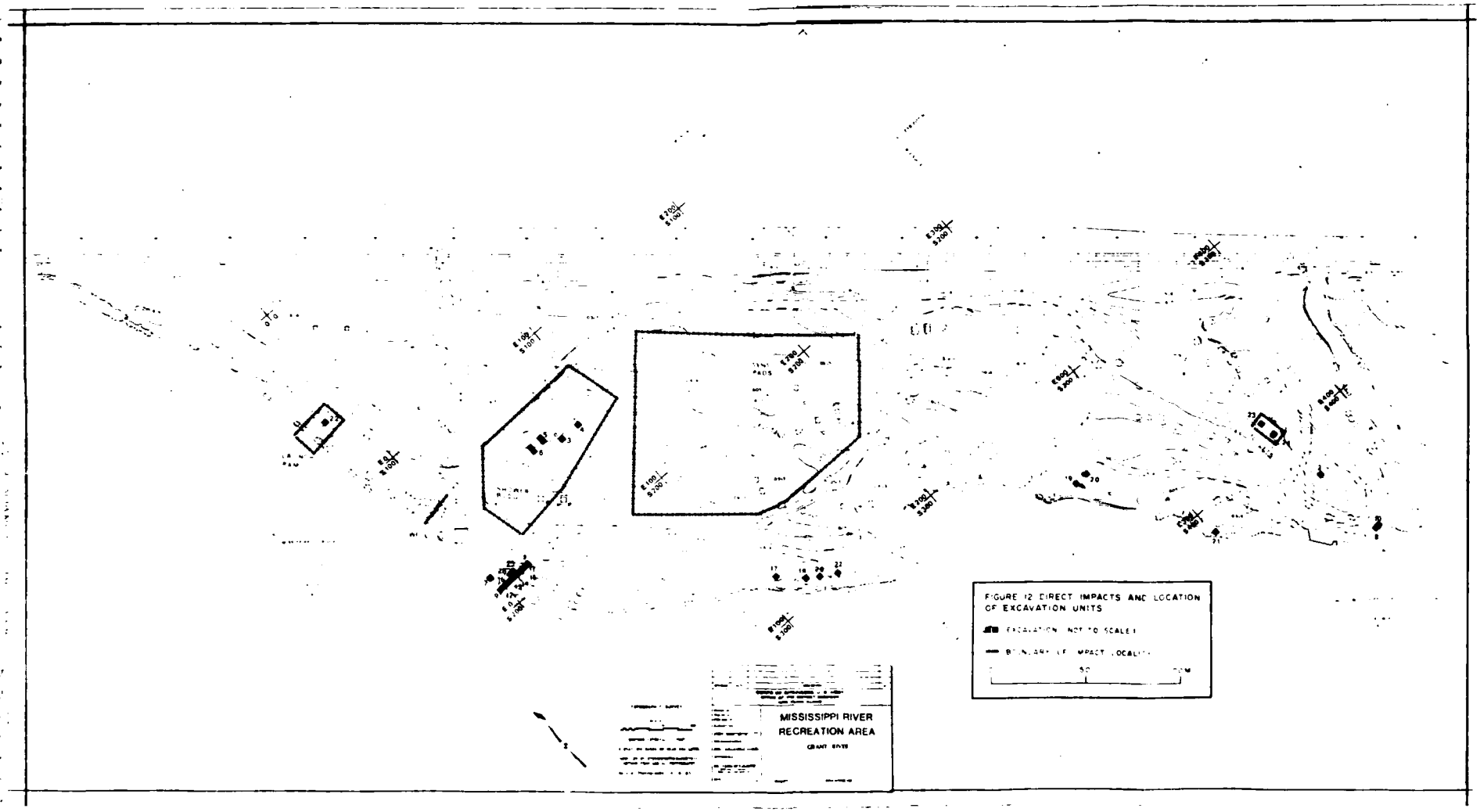
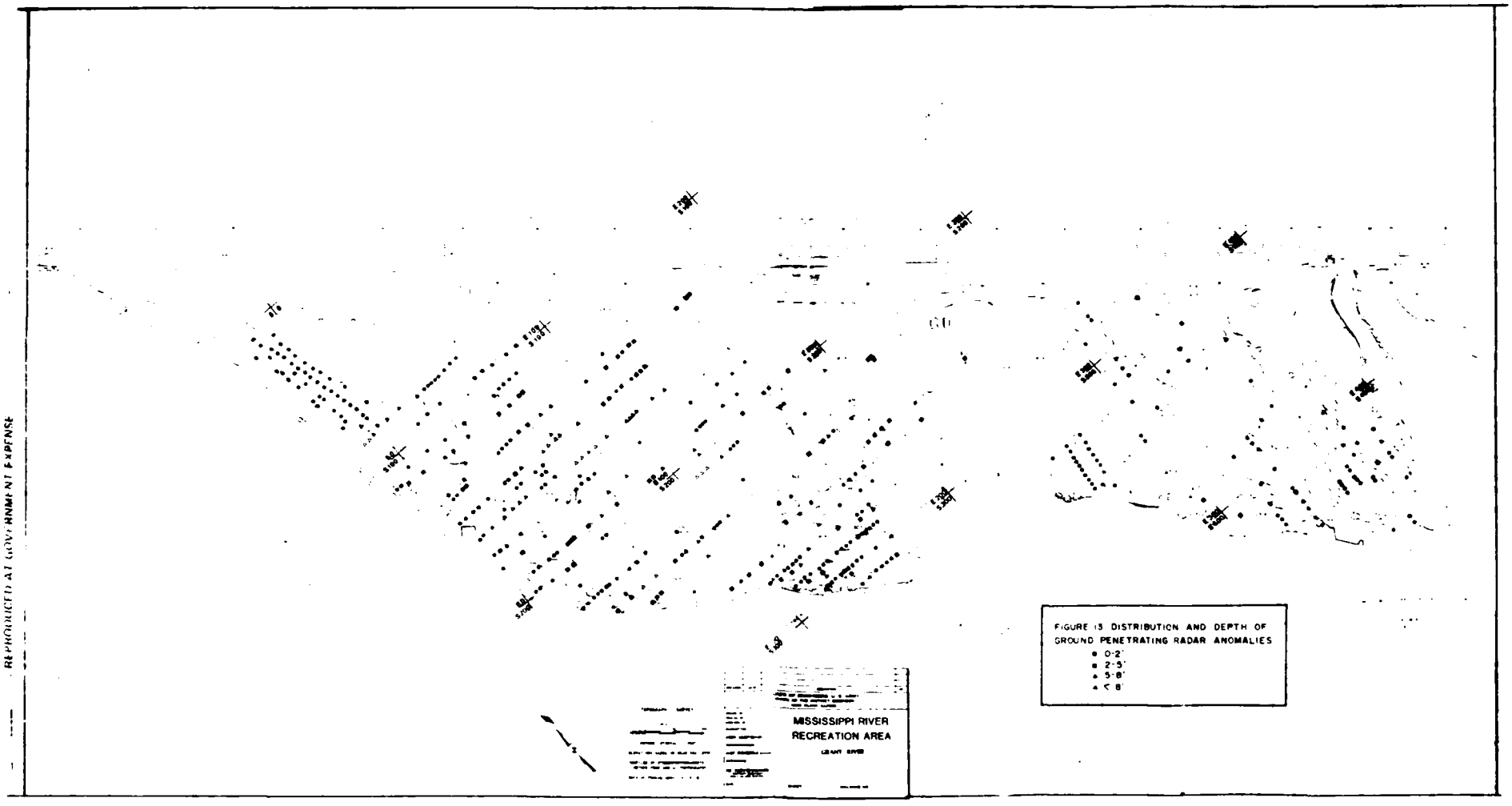


FIGURE 12 DIRECT IMPACTS AND LOCATION OF EXCAVATION UNITS



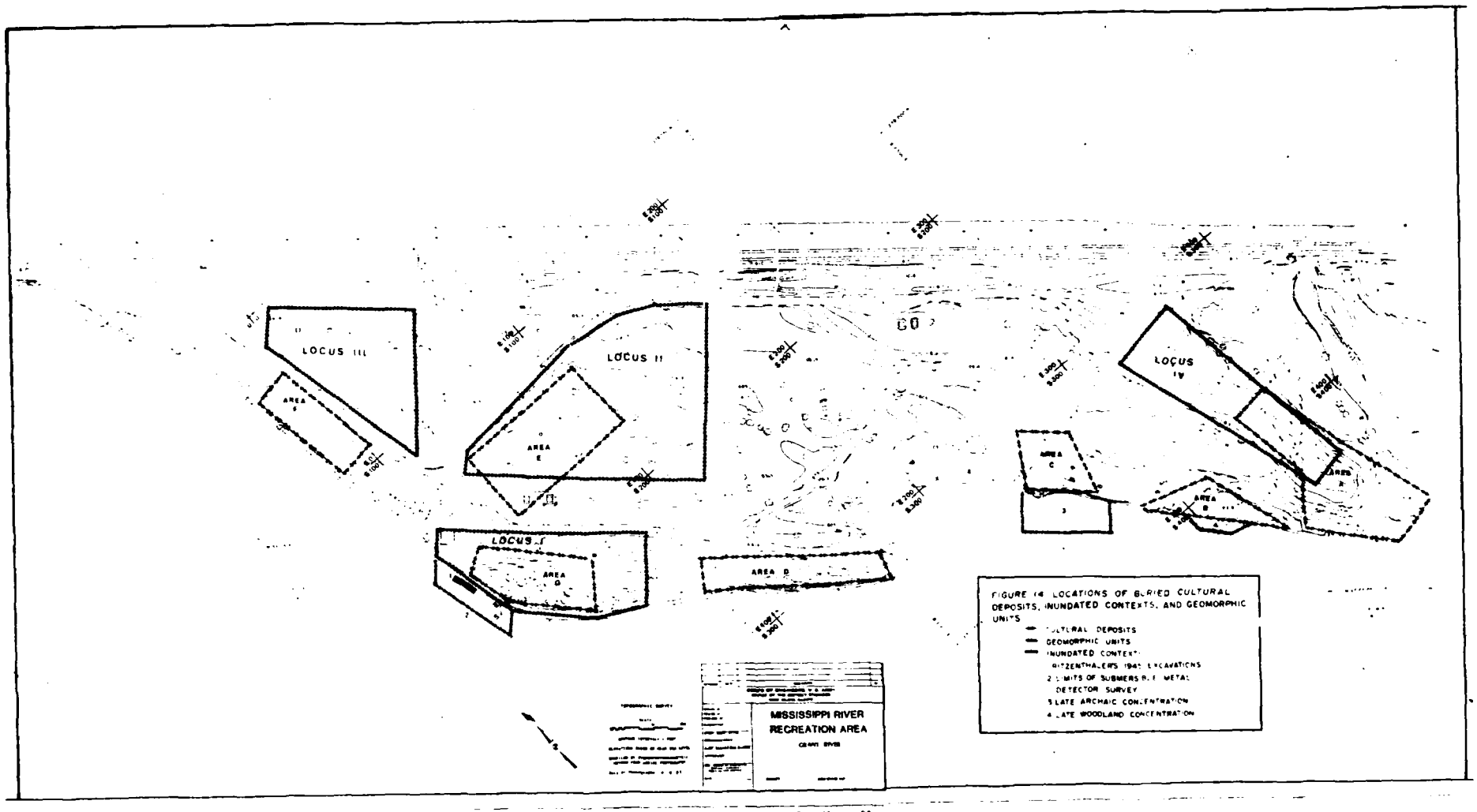


FIGURE 14 LOCATIONS OF BURIED CULTURAL DEPOSITS, INUNDATED CONTEXTS, AND GEOMORPHIC UNITS

- CULTURAL DEPOSITS
- GEOMORPHIC UNITS
- INUNDATED CONTEXT
  - 1 BITZENTHALER'S 1941 EXCAVATIONS
  - 2 LIMITS OF SUBMERGED METAL DETECTOR SURVEY
  - 3 LATE ARCHAIC CONCENTRATION
  - 4 LATE WOODLAND CONCENTRATION

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